

PA40x/PT40x Series

PORTABLE PRINTERS

Maintenance Manual Revision 3 Registration Form

ZEBRA TECHNOLOGIES CORPORATION

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NOTES

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Section 1

Description of Equipment

Description

The Zebra *PA40x* Series is a low-cost, portable, direct thermal printer. The Zebra *PT40x* Series is a low-cost, portable, thermal transfer printer. Both can be carried by the shoulder strap, sit on a workspace, or be mounted to a specific location. The battery makes them truly portable especially in environments where AC power is not readily available. The *PA/PT40x* Series deliver traditional Zebra reliability in a transportable label printer for the mobile work environment.

Printer Operating Modes

- **Tear-Off Mode.** The operator tears off a single label (or a strip of labels) after printing.
- **Peel-Off Mode.** The liner is peeled away from the label as it prints, the printer waits until the operator removes the label, and then the next label prints.

Printing Method

- **Direct Thermal Printing (*PA40x* Series)** (requires direct thermal media). A substrate, typically paper, is coated with a chemical that changes to a dark color upon exposure to heat over a period of time to form an image.
- **Thermal Transfer Printing (*PT40x* Series)** (requires thermal transfer media and ribbons). An image is formed by the heat of the printhead transferring to the ribbon, releasing ink directly to the substrate to produce the printed image.

Specifications

Table 1-1. Specifications

Print density		203 dots/in.	8 dots/mm
Print width		1.0 in. to 4.09 in.	25.4 mm to 104 mm
Print speed		1.5 in./sec or 2 in./sec	38.1 mm/sec or 50.8 mm/sec
Label width (Including liner)		1.0 in. to 4.25 in.	25.4 mm to 108 mm
Label length (standard memory)		0.50 in. to 10 in.	12.7 mm to 254 mm
Interlabel gap		0.08 in. to 0.16 in.	2 mm to 4 mm
Label thickness		0.0030 in. to .0106 in.	0.076 mm to 0.269 mm
Label roll size	Max. outer diameter	2.1 in.	53.3 mm
	Core inner diameter	1.0 in.	25.4 mm
Registration tolerance	Horizontal	± 0.059 in.	± 1.5 mm
	Vertical	± 0.0393 in.	± 1.0 mm
Distance from center print element to center of label		± 0.0393 in.	± 1.0 mm
Physical size (L × W × H)		2.9 in. × 9.3 in. × 7.9 in.	74 mm × 235 mm × 200 mm
Weight (without media)		3.9 lbs.	1.77 kg
Operating temperature range		32° to 104° F	0° to 40° C
Storage with battery temperature range		−4° to 122° F	−20° to 50° C
Storage without battery temperature range		−4° to 140° F	−20° to 60° C
Relative humidity	Operation	10 to 90% (non-condensing)	
	Storage	5 to 95% (non-condensing)	
Fonts available		Zebra fonts A, B, C, D, E, H, GS CG Triumvirate Bold Condensed scalable smooth	
Media requirements		<p>Zebra recommends using Zebra-brand direct thermal roll media that is outside-wound. Media may be transmissive or reflective (black mark) sensing, continuous, die-cut, or notched.</p> <p>For die-cut labels, use only true auto dies.</p> <p>Notched media must have a 1/2 in. (12.7 mm) wide × 3/32 in. (2.4 mm) long cutout in the center of the roll. The reflective media black marks must be in the center of the roll.</p> <p>Minimum Black Mark Dimensions:</p> <p>Mark width: 0.5 in. (12.7 mm) perpendicular to edge of media.</p> <p>Mark height: 3/32 in. (2.4 mm) parallel to edge of media.</p>	
Bar codes available (1D)		Codabar (supports ratios of 2:1 to 3:1) Code 11 Code 128/USD 8 (supports serialization in all subsets and UCC Case Codes) Code 39 (supports ratios of 2:1 to 3:1) Code 93 EAN 8/JAN 8 EAN 13/JAN 13 EAN14/UPC A	Industrial 2 of 5 Standard 2 of 5 Interleaved 2 of 5 (supports ratios of 2:1 to 3:1, Modulus 10 Check Digit) LOGMARS MSI Plessey POSTNET UPC E UPC/EAN Extensions
Bar codes available (2D)		Codablock Code 49 Data Matrix Maxicode	MicroPDF417 PDF 417 QRcode

Table 1-1. Specifications (Continued)

Rotation angles	0, 90°, 180°, and 270°	
ROM memory (standard)	1 MB <i>PA/PT400</i> —2 MB <i>PA/PT403</i>	
RAM memory (standard)	512 KB <i>PA/PT400</i> —2 MB <i>PA/PT403</i>	
Electrical	Standard Battery — 14.4 VDC 700 mAh NiCd Battery Extended Life Battery — 13.2 VDC 1400 mAh NiCd Battery 120 VAC, 60 Hz Battery Charger Universal Battery Charger (100–240 VAC, 50–60 Hz)	
Communications	RS-232 (RJ-45 serial port with 8 pins)	
Data speed (maximum)	19,200 Baud	
Processor	32-bit RISC Microcontroller with 16 bit data bus architecture	
Agency approvals	UL 544 Medical Equipment Standard Part 42.5 CSA 22.2 No. 950 Canadian Safety Standard IEC 950/EN 60950 International Safety Standard FCC Part 15 Subpart A Level A Electromagnetic Radiation Standard* FCC Part 15 Subpart B Level A Electromagnetic Radiation Standard** Canadian DOC Class A UL 1950 3rd Edition Domestic Safety Standard SOR/88-475 Canadian Electromagnetic Radiation Standard EN50082-1 International Immunity Standard EN55022 Class B European Electromagnetic Radiation Standard	
Ribbon width	4.33 in.	110 mm
Ribbon outer diameter	0.66 in.	16.8 mm
Carrying strap***	1 in. web width	25.4 mm web width
*Meets FCC Subpart A when using unshielded cables and the 120 VAC Battery Charger.		
**Meets FCC Subpart B when using shielded cables and the Universal Battery Charger.		
***See Figure 4-19 on page 4-30 for a hole drilling template for mounting the <i>PA/PT40x</i> .		

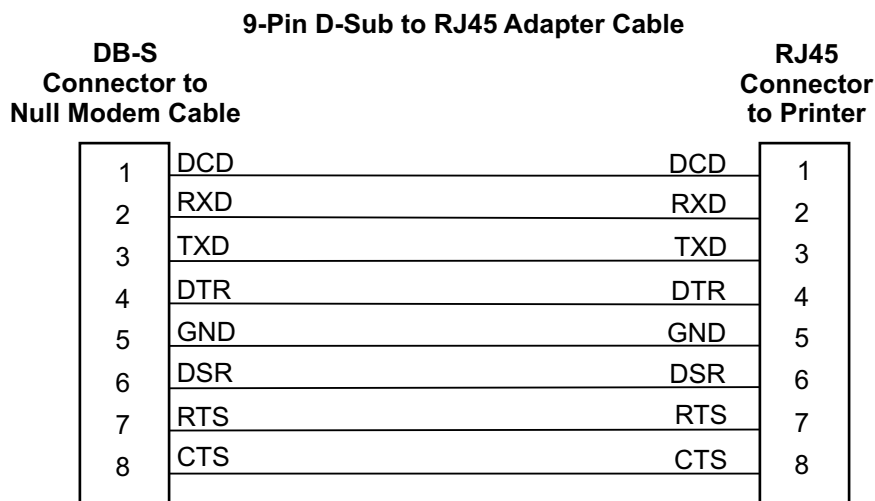


Figure 1-1. Adapter Cable Pinouts

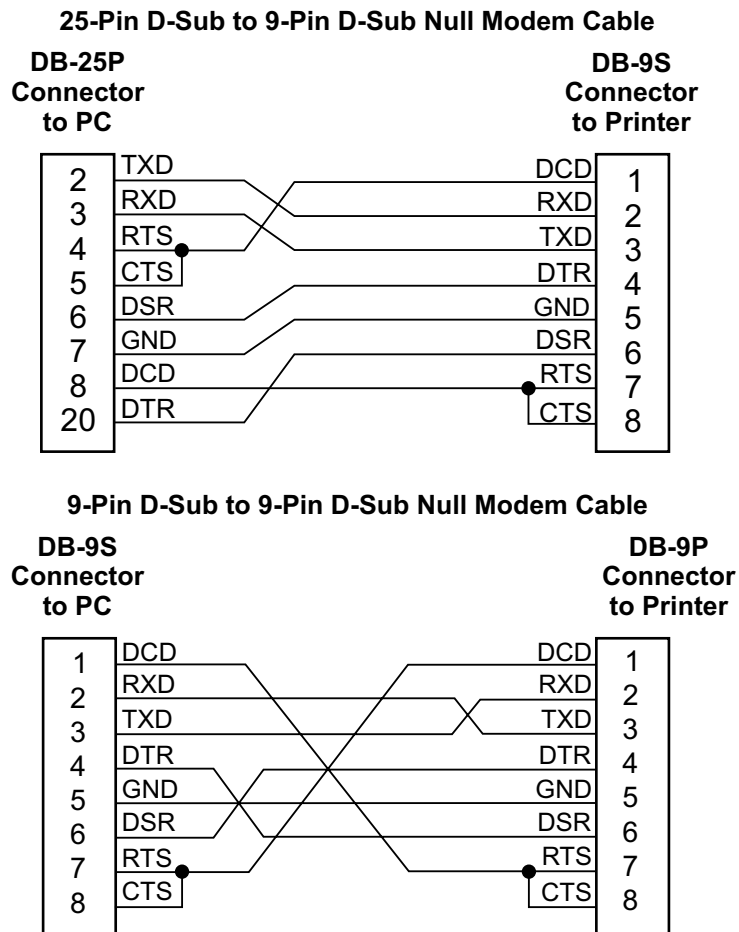


Figure 1-2. Null Modem Cables

Electronics System Block Diagram

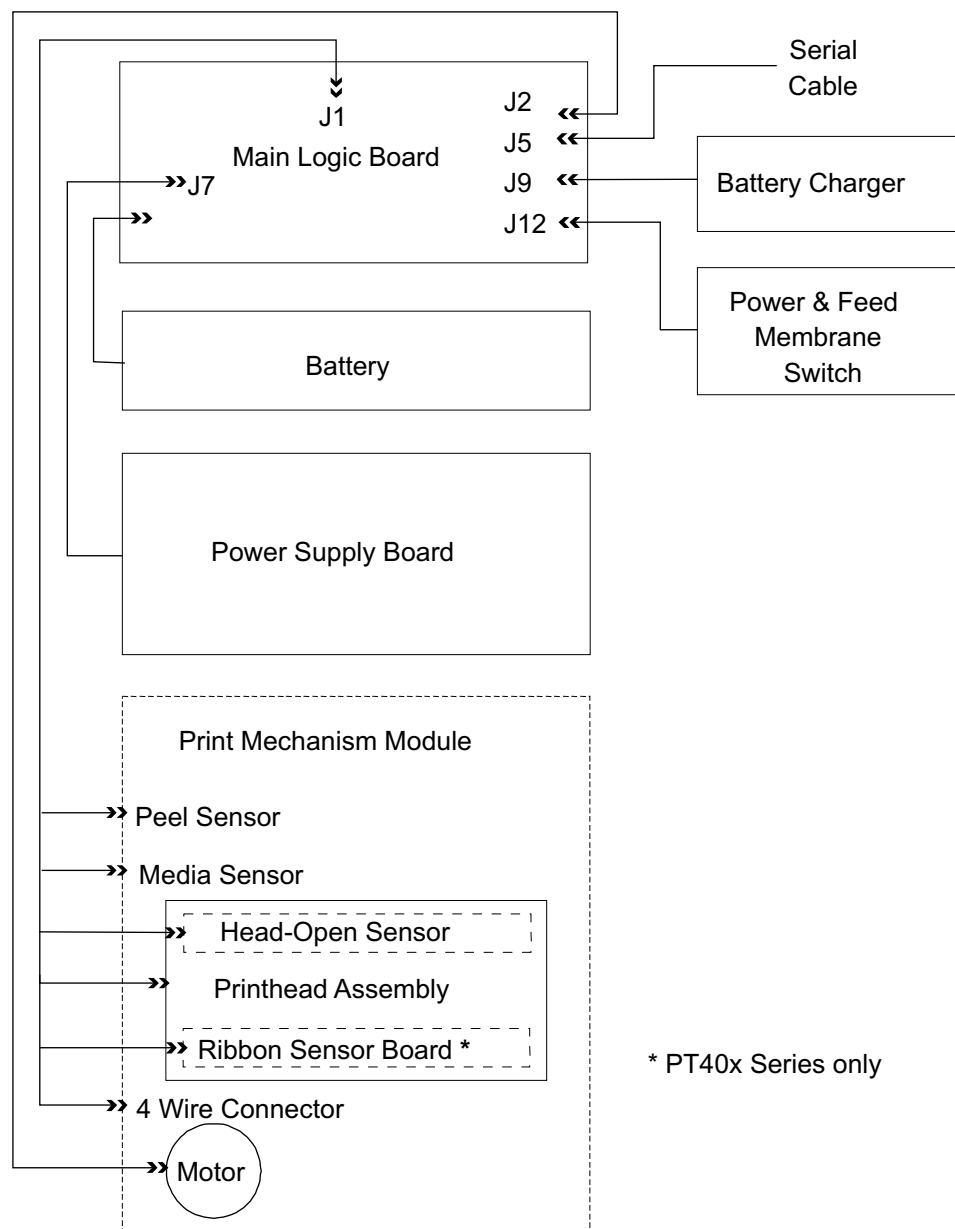


Figure 1-3. PA/PT40x Electronics System Block Diagram



Section 2

Operation Overview

Operator Controls

Refer to Figure 2-1.

Power Button

Press to turn printer On (I).

Press and hold for two seconds to turn printer Off (O).

Feed Button

Forces the printer to feed one blank label.

Takes the printer out of a pause condition. The printer pauses from a ZPL command or an error condition.

Used for printer setup and status.

Power LED (Green)

On during normal printer operations.

Functions as the battery status indicator (refer to Troubleshooting on page 3-1).

Error LED (Orange)

Off during normal printer operation.

Double flashing indicates the printer is paused (refer to Troubleshooting on page 3-1).

Functions as the printer operational status indicator (refer to Troubleshooting on page 3-1).

Battery Charging LED (Yellow)

Refer to Figure 2-2.

On while battery is fast charging.

Flashing indicates the battery is not installed, printer is preparing the battery for fast charging, or battery overheats while charging.

Off if the battery is fully charged or the battery charger is not plugged in. If the battery charger is plugged in, the battery receives a continuous maintenance charge.

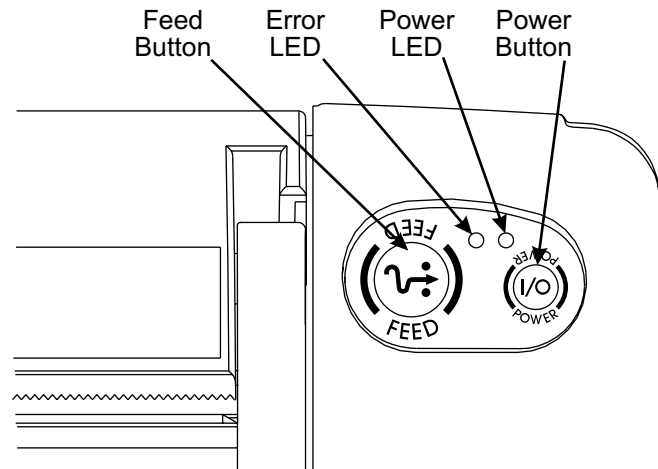


Figure 2-1. Operator Controls

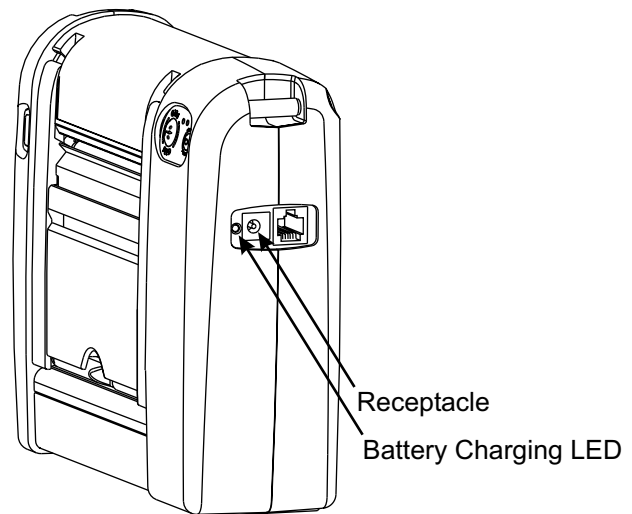


Figure 2-2. Battery Charger Receptacle

Install Battery



The EPA, certified RBRC® Battery Recycling Seal on the nickel-cadmium (Ni-Cd) battery indicates Zebra Technologies is voluntarily participating in an industry program to collect and recycle these batteries at the end of their useful life, when taken out of service in the United States or Canada. The RBRC program provides a convenient alternative to placing used Ni-Cd batteries into the trash or the municipal waste stream, which may be illegal in your area. Please call 1-800-8-BATTERY™ for information on Ni-Cd battery recycling and disposal bans or restrictions in your area.



Notes • To avoid losing data, the battery charger may be left attached to the printer while changing batteries.

Note • Batteries are shipped uncharged

When the battery is first installed, the Power and Error LEDs illuminate for approximately two seconds and then go off. If these lights do not go on, the battery is not fully charged.

1. Refer to Figure 2-3. Slide open the battery compartment door.
2. Insert the battery into the printer with the battery contacts facing up.
3. After the battery is completely inserted, close the battery compartment by sliding the battery compartment door down.

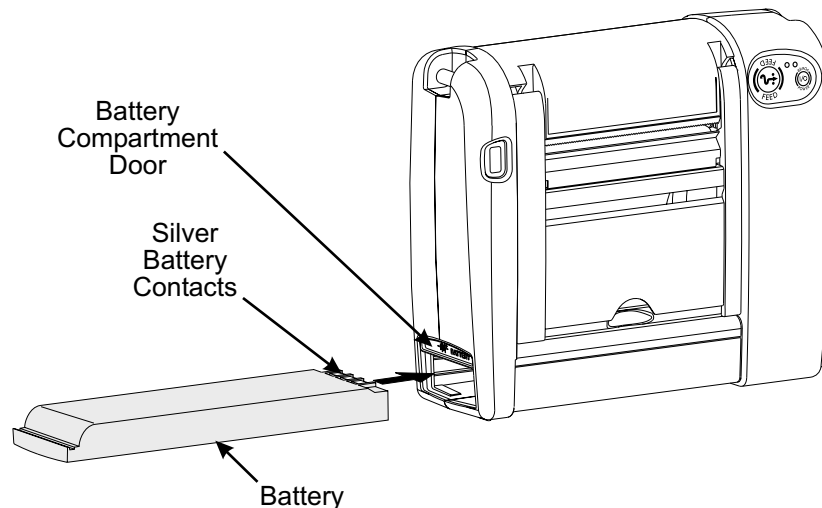


Figure 2-3. Install Battery

Charge Battery



Note • Completely discharge the battery before recharging. Wait until a battery under voltage — level 1 indication (Error LED is off and Power LED is flashing) exists before recharging.

Refer to Figure 2-4.

120 VAC Battery Charger

1. With the battery installed in the printer, insert the connector of the battery charger into the receptacle on the side of the printer.
2. Plug the transformer into an appropriate 120 VAC electrical outlet.
3. The battery charging LED briefly flashes and then stays on. When the battery is fully charged, the LED goes off. It takes approximately one hour for the standard battery and two hours for the extended life battery to charge.
4. You may leave the battery charger connected to the printer after the battery has charged to apply a continuous maintenance charge.

Universal Battery Charger

1. With the battery installed in the printer, insert the battery charger connector into the receptacle on the side of the printer.
2. Ensure the supplied power cord is inserted into the battery charger.
3. Plug in the other end of the power cord into the appropriate AC electrical outlet.
4. The battery charging LED briefly flashes and then stays on. When the battery is fully charged, the LED goes off. It takes approximately one hour for the standard battery and two hours for the extended life battery to charge.
5. You may leave the battery charger connected to the printer after the battery has charged to apply a continuous maintenance charge.

Extending Battery Life



The EPA, certified RBRC® Battery Recycling Seal on the nickel-cadmium (Ni-Cd) battery indicates Zebra Technologies is voluntarily participating in an industry program to collect and recycle these batteries at the end of their useful life, when taken out of service in the United States or Canada. The RBRC program provides a convenient alternative to placing used Ni-Cd batteries into the trash or the municipal waste stream, which may be illegal in your area. Please call 1-800-8-BATTERY™ for information on Ni-Cd battery recycling and disposal bans or restrictions in your area.

- Never expose the battery to direct sunlight or temperatures over 104° F (40° C).
- Choose the media that is easiest to burn. An authorized Zebra distributor can help determine this.
- If printing the same text or graphic on every label, consider using a preprinted label.
- Choose the correct print darkness, speed, and printhead pressure for the media.
- Use software handshaking (XON/XOFF) whenever possible.
- Select Tear-Off Mode whenever possible.
- Pull the battery out of the printer if it will not be used for a day and a maintenance charge is not being performed.
- Completely discharge the battery before recharging. Wait until a battery under voltage — level 1 indication (Error LED is off and Power LED is flashing) exists before recharging.
- Consider purchasing an extended life battery, which offers approximately 50% longer life than the standard battery.

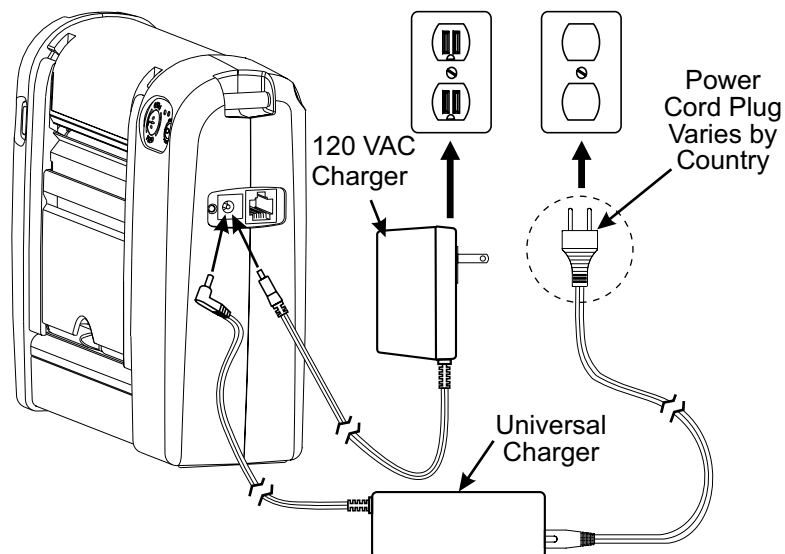


Figure 2-4. Connecting Battery Charger

Printer Overview

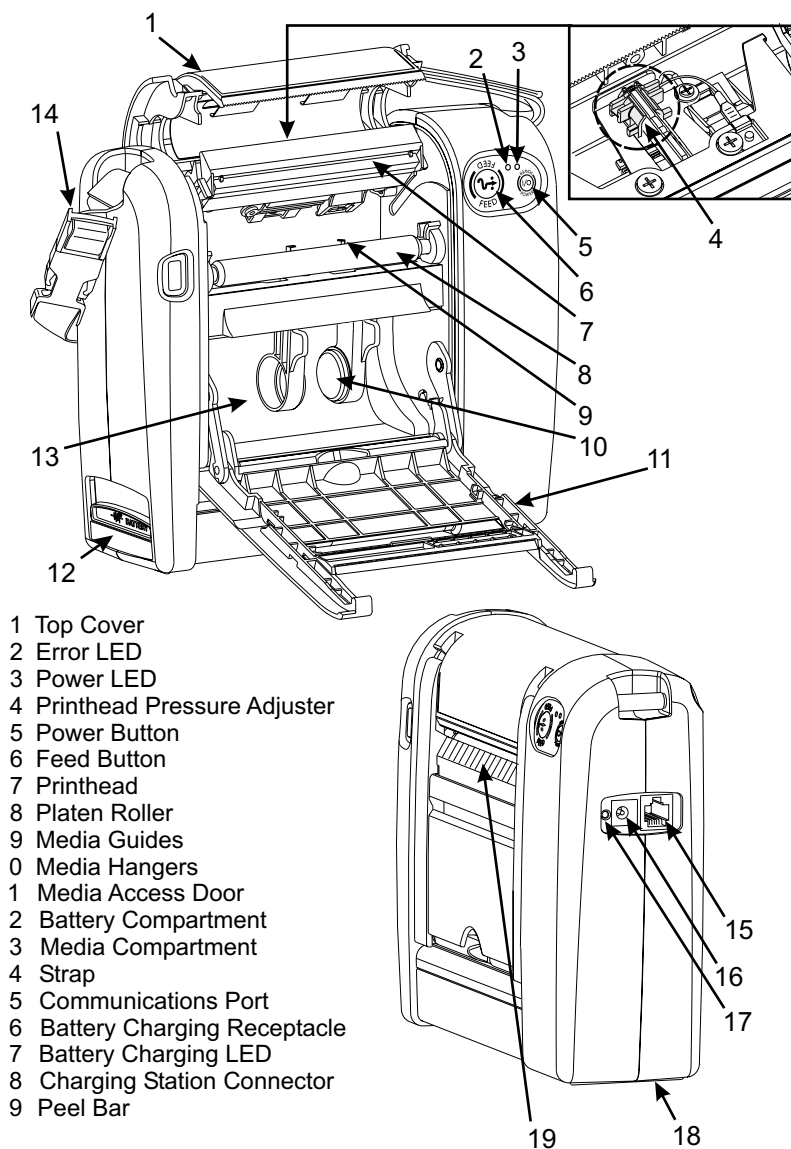


Figure 2-5. Printer Overview

Load Supplies

Refer to Figure 2-5 for general printer assembly terminology and location for loading supplies.

Caution: Do not touch the print elements the printhead. Dirt and moisture from you hands can prematurely shorten the printhead life.

Tear-Off Mode

1. Refer to Figure 2-6. Raise the media access door by lifting at the notch until it unhooks from the top cover.
2. Refer to Figure 2-7. Swing open the media access door to expose the media compartment.
3. Pivot the top cover up to reveal the printhead.
4. Lift the printhead until you feel it lock in place. Do not force the printhead past this position.
5. Refer to Figure 2-8. Unroll approximately 6 in. (150 mm) of media. Thread the end of the media into the printer, just below and behind the media hangers. Push the end of the media into the printer until it extends approximately 1 in. (25 mm) beyond the printhead.
6. Separate and hold open the media hangers.
7. Place the media roll onto the media hangers, ensuring it is tightly wound.
8. Refer to Figure 2-7. Release the media hangers so the media locks into the correct position. Ensure the media is threaded under both media guides.
9. Refer to Figure 2-9. Install the tear blade into the media access door. Gently lift the tab on the bar to get it over the door protrusion. Ensure the lip of the bar faces out.
10. Close the printhead and the top cover.
11. Refer to Figure 2-10. Swing up the media access door, ensuring that the media extends over the tear blade.
12. Lift to hook the top of the media access door over the top cover.
13. Push in the bottom of the media access door to close.
14. Turn the printer On (I) or press **FEED** if the printer is already on.

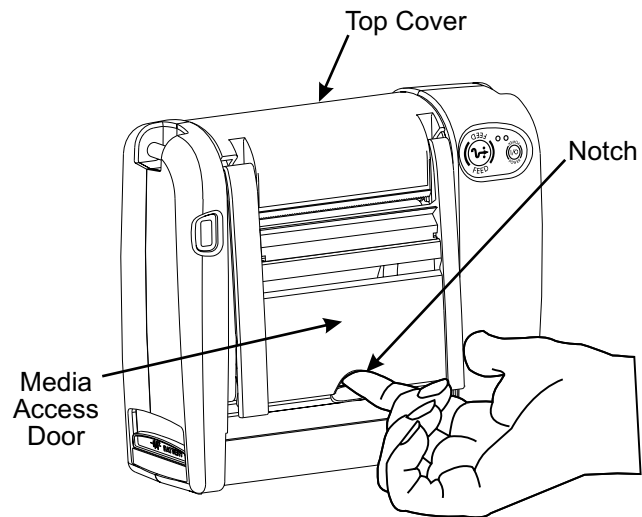


Figure 2-6. Open Media Access Door

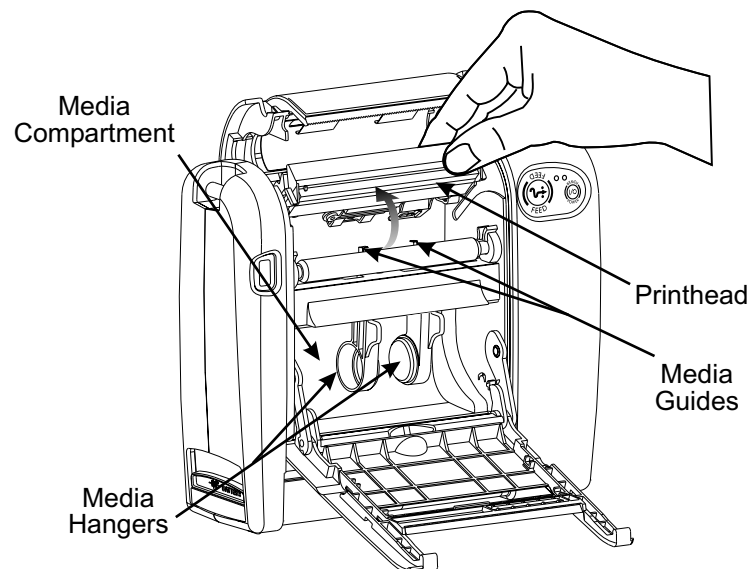
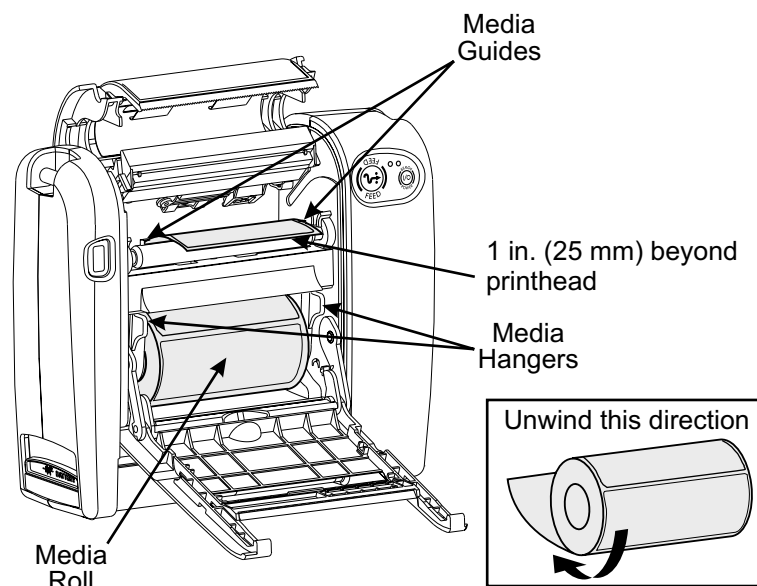
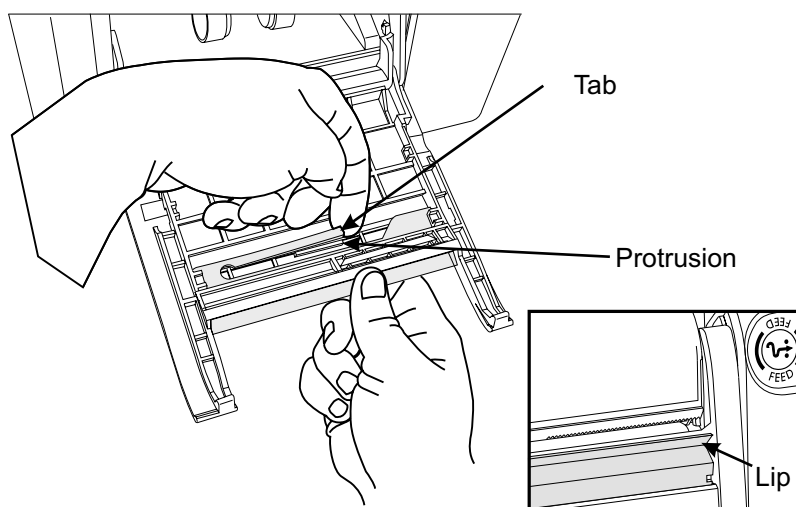


Figure 2-7. Raise Printhead Assembly

**Figure 2-8. Load Media****Figure 2-9. Install/Remove Tear Blade**

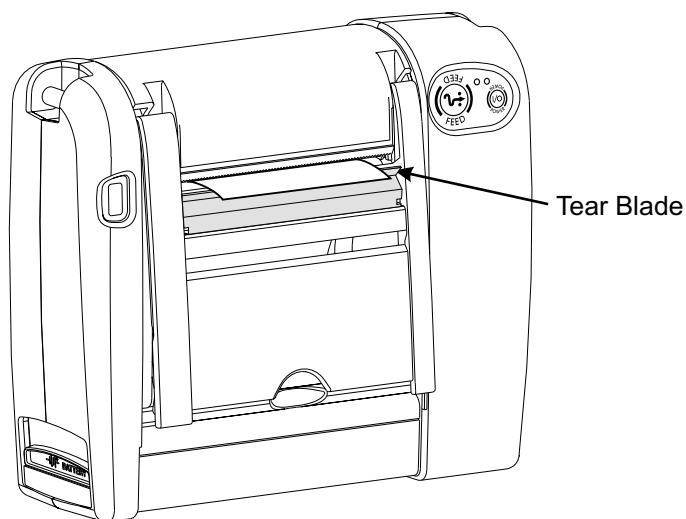


Figure 2-10. Media Over Tear Blade

Caution: Do not touch the print elements the printhead. Dirt and moisture from you hands can prematurely shorten the printhead life.

Peel-Off Mode

1. Refer to Figure 2-6. Raise the media access door by lifting at the notch until it unhooks from the top cover.
2. Refer to Figure 2-7. Swing open the media access door to expose the media compartment.
3. Pivot the top cover to reveal the printhead.
4. Lift the printhead until you feel it lock in place. Do not force the printhead past this position.
5. Refer to Figure 2-8. Unroll approximately 6 in. (150 mm) of media. Remove and discard the first label. Thread the end of the media into the printer, just below and behind the media hangers. Push the end of the media into the printer until it extends approximately 1 in. (25 mm) beyond the printhead.
6. Separate and hold open the media hangers,
7. Place the media roll onto the media hangers.
8. Refer to Figure 2-7. Release the media hangers so the media locks into the correct position. Ensure the media is threaded under both media guides.
9. Refer to Figure 2-9. The tear blade should not be installed in the printer. To remove the tear blade, gently lift the tab on the bar to get it over the door protrusion. Pull the tear blade out of the printer.

Refer to Figure 2-11. The tear blade should be stored on the inside of the media access door. With the lip of the tear blade facing the inside of the door, place the notches of the tear blade over the tabs on the door. Press and slide the tear blade toward the hinged end. Lift the tab to allow the tear blade to slip past the protrusion and lock in place.

10. Close the printhead and the top cover.
11. Swing up the media access door, ensuring that the media liner is threaded through the bottom slot in the media access door.
12. Lift to hook the top of the media access door over the top cover.
13. Push in the bottom of the media access door to close.

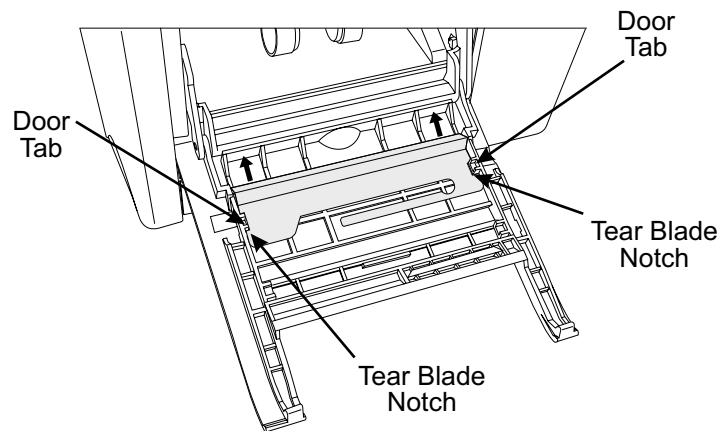


Figure 2-11. Store Tear Blade

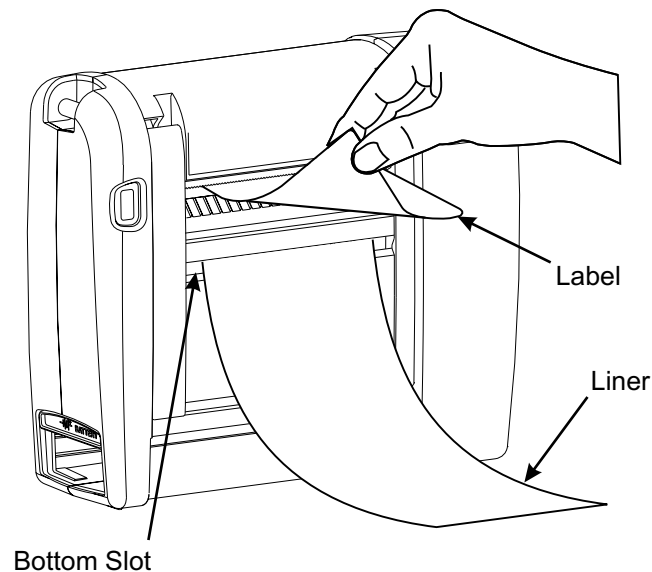


Figure 2-12. Thread Liner Peel-Off Mode

Load Ribbon

1. Lift the printhead until you feel it lock in place.
2. Hold the ribbon cartridge as shown in Figure 2-13. The placement arrows should be visible and pointing toward the rear of the printer.
3. Install the ribbon cartridge onto the printhead. The portion of the cartridge with the white gear should be placed over the printhead.
4. Refer to Figure 2-14. The ribbon cartridge automatically slides into the correct operating position.
5. Refer to Figure 2-15. Close the printhead and the top cover.
6. Refer to Figure 2-10 for Tear-Off or Figure 2-12 for Peel-Off. Swing the media access door up, ensuring the media is properly extended.
7. Lift to hook the top of the media access door over the top cover.
8. Push in the bottom of the media access door to close.
9. Turn the printer On (I) or press **FEED** if the printer is already on.



Note • To remove the ribbon cartridge, reverse the above procedures.

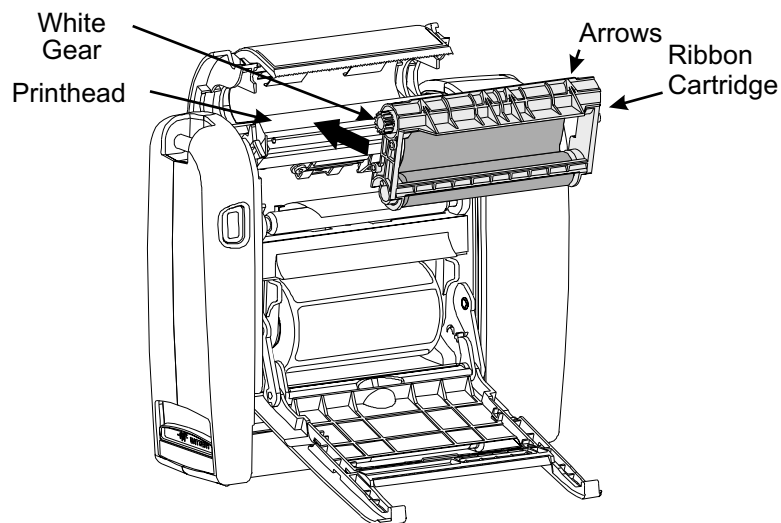


Figure 2-13. Insert Ribbon Cartridge

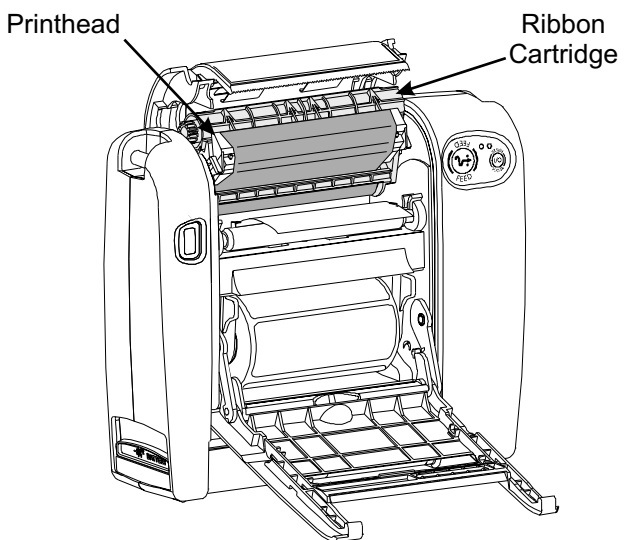


Figure 2-14. Operate Position (Ribbon Cartridge)

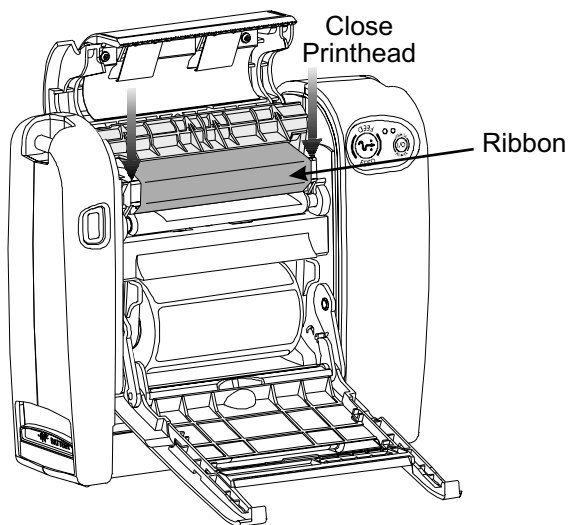


Figure 2-15. Close Printhead and Cover

Initial Power Up

Print Test Label

Before connecting the printer to a computer or portable data terminal, ensure it is in proper working order. Print a configuration label by following the instructions in Table 2-1. A sample configuration label is shown in Figure 2-16.

Printer Configuration	
10.....	Darkness
-25.....	Tear Off Adjust
059.....	Web Sensor
085.....	Media Sensor
063.....	Ribbon Sensor
080.....	Mark Media Sensor
050.....	Mark Sensor
070.....	Media Led
100.....	Ribbon Led
255.....	Mark Led
1225.....	Label Length
10.00IN 253MM.....	Max Label Length
4.09IN 104MM.....	Print Width
Tear Off.....	Print Mode
Non-Continuous.....	Media Type
Direct Thermal.....	Print Method
19200.....	Baud
8.....	Data Bits
None.....	Parity
2.....	Stop Bits
XON/XOFF.....	Handshake
None.....	Protocol
2CH.....	Delimiter
5EH.....	Format Prefix
7EH.....	Control Prefix
000.....	Network ID
C.....	Modes Enabled
	Modes Disabled
832 8/mm Full.....	Resolution
Default.....	Backfeed
+00.....	Label Top
+0000.....	Left Position
	Socket 1 ID
VX.X.X.....	Firmware
V2.X.....	Boot Rom
Customized.....	Configuration
0512k.....	Memory
None.....	B: Memory
Installed.....	E: Memory
15.00.....	Battery Voltage
Calibrate.....	Media Power Up
Calibrate.....	Media Head Close

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Figure 2-16. Sample Configuration Label

```

^FS^F0394,25^AA
5E 46 53 5E 46 4F 33 39 34 2C 32 35 5E 41 41

N,18,10^FD(0000
4E 2C 31 38 2C 31 30 5E 46 44 28 30 30 30 30

)999-9999^FS
29 39 39 39 2D 39 39 39 39 5E 46 53 0D 0A

^F00,50^AAN,18,
5E 46 4F 30 2C 35 30 5E 41 41 4E 2C 31 38 2C

10^FDCENTER STA
31 30 5E 46 44 43 45 4E 54 45 52 20 53 54 41

```

Figure 2-17. Sample ASCII/Hex Data Received Label

Table 2-1. FEED Mode Chart

Power Off Mode (Communications Diagnostics Mode)	
<p>With the printer Off (O), press and hold FEED while you turn the printer On (I). Refer to Figure 2-16. The printer prints out a list of its current configuration. Refer to Figure 2-17. After printing the label, the printer will automatically enter a diagnostic mode and prints out a literal representation of all data subsequently received.</p>	
Power On Modes	
<p>With the printer On (I), printhead closed, and Error LED off, press and hold FEED for several seconds. The Error LED begins a series of flash sequences. Each sequence consists of a different number of flashes as shown in the table. The corresponding action indicates what happens when you release FEED after each flash sequence.</p>	
Flash Sequence	Action
*	A configuration label prints.
* **	The media sensor is calibrating and a media sensor profile prints.
* ** ***	The serial communication parameters are reset to 9600 baud, 8-bit word length, no parity, and 1 stop bit, and flow control is set to XON/XOFF.
* ** *** ****	Resets the printer to factory defaults and the values are saved in memory. The printer also automatically performs a calibration.
* ** *** **** *****	The print width is calibrating. While the Error LED flashes rapidly, a series of stacking rectangle prints on the label. When the rectangle prints to the outer edges of the label, press and release FEED . The label width is saved in memory.
* ** *** **** ***** *****	If FEED is held for six flashes and released, the printer ignores it when released.
* ** *** **** ***** ***** *****	If FEED is held for six flashes and held an additional five seconds after the sixth flash, the LED flashes a seventh time. When released after the seventh flash, the ribbon sensor board (PT40x series only) will calibrate. Once calibration is completed, the LED flashes rapidly. Press and release FEED one more time to save the calibration.

Connect Computer



Caution:

The RJ45 jack on the side of the printer is for serial port communications only! Do not connect to a telephone jack. This will damage the printer.

The *PA/PT40x* Series printer is configured as Data Terminal Equipment (DTE). The null modem cable used to connect the computer to the adapter cable and printer may be either:

- 9-pin D-type (DB9S) computer serial port connector to a 9-pin D-type (DB9P) adapter cable connector.
- 25-pin D-type (DB25S) computer serial port connector to a 9-pin D-type (DB9P) adapter cable connector.

For pin out information, refer to Figure 1-2 on page 1-4.

Refer to .

1. Plug the null modem cable into the serial data port of the computer.
2. Plug the other end of the null modem cable into the connector of the printer adapter cable.



Note • The adapter cable maintains interface compatibility with the full line of Zebra printers.

3. Plug the adapter cable into the printers communication port.

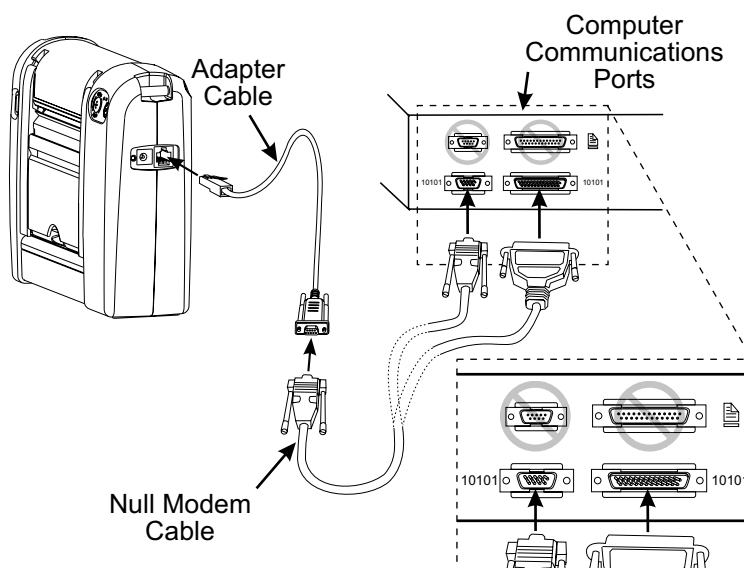


Figure 2-18. Serial Cable Hookup

Set Communication Parameters

When using the printer's serial port to transfer data, the printer and the computer must have identical communication parameter settings.

Default values

Press and hold **FEED** until the Error LED flashes once, twice, and then three times. Release **FEED** after the LED flashes three times. The baud rate for the printer resets to 9600 baud, 8-bit word length, no parity, 1 stop bit, and the flow control sets to XON/XOFF. The computer's communication parameters now need to match the default settings of the printer. Refer to Table 2-1 for a complete listing of Feed Modes.

Custom values

If settings different from the default values are needed, send the set communications (^SC) ZPL command at 9600 baud via the serial port setup, then reset the computer to the new values (see the *ZPL II Programming Guide* for the complete command syntax). To save the settings permanently, send the ^JUs ZPL II command or recalibrate the printer.

Calibrate

The printer's media sensor sensitivity establishes how your printer detects the top of the label. If you are using die-cut label media, the printer needs to detect the difference between no media in the printer at all, liner only (indicating the space/gap between labels), and a label plus liner.

To make these distinctions, the printer shines light through the media and measures the amount of light making it through the media. In this way, the printer can detect where your labels begin and end, and when you run out of media.

Amount of light detected	What it is detecting	What it means
High	Nothing. No media is present.	Out of media or the notch/gap between labels if you are using notched media or tagstock.
Medium	Media liner only.	The web between labels is directly under the sensor.
Low	Label plus liner.	A label is directly under the sensor.



Note • If you are using notched media or tagstock, the values for High and Medium will be identical. This is because the space between tags is indicated by a notch or gap in the media, instead of by the web between labels.

Auto-Calibration



Note • The printer does not auto-calibrate correctly when you are using preprinted labels. If this type of media is being used, see Manual Calibration on page 2-17.

By default, this printer automatically sets the sensor levels and determines the length of the label being used. To auto-calibrate:

1. Turn the printer On (**I**).
2. Load the media and close the printhead.
3. Press **FEED**. Two labels print, completing auto-calibration.

Auto-calibration works only when you are using non-continuous media (a gap or notch separates each label).

Auto-calibration is performed when the printer is turned On (**I**) (if the printhead has been opened) and whenever an error is cleared.



Note • Refer to Table 2-1. Performing a manual calibration disables the auto-calibration function. To return to auto calibration, either default the printer or refer to your label preparation software users guide.

Note • When using black mark or web labels, set the appropriate software command (see your label preparation software users guide) before performing a manual calibration.

Manual Calibration

Perform manual calibration whenever preprinted labels are being used or if the printer does not auto-calibrate. To calibrate manually:

1. Turn the printer On (**I**).
2. Remove several labels from a section of the liner to thread the liner only through the printer.
3. Press and hold **FEED** until the Error LED flashes once, then twice. Release **FEED**. Refer to Table 2-1 for a complete listing of Feed Modes.
4. The printer sets the media sensor for the liner being used. After it makes this adjustment, the roll automatically feeds until a label is positioned at the printhead.
5. Refer to Figure 2-19. A profile of the media sensor setting prints. Upon completion, the printer saves the new settings in memory and the printer is ready for normal operations.

Calibrate Ribbon Sensor

PT40x only

Perform this ribbon sensor calibration whenever a new Ribbon Sensor Board is installed. To calibrate the ribbon sensor:

1. Turn printer Off (**O**).
2. Install an empty ribbon cartridge with a white core into the *PT400*.
3. Turn the printer On (**I**).
4. Press and hold **FEED**.
5. The Error LED begins to flash. When the LED flashes for the sixth time, continue to hold (for an additional five seconds) until the seventh flash. Release **FEED** after the seventh flash.
6. When the ribbon sensor calibration is complete, the Error LED flashes rapidly. Press and release **FEED** one more time to save the calibration.
7. Remove the empty ribbon cartridge and reload with a ribbon cartridge containing ribbon.

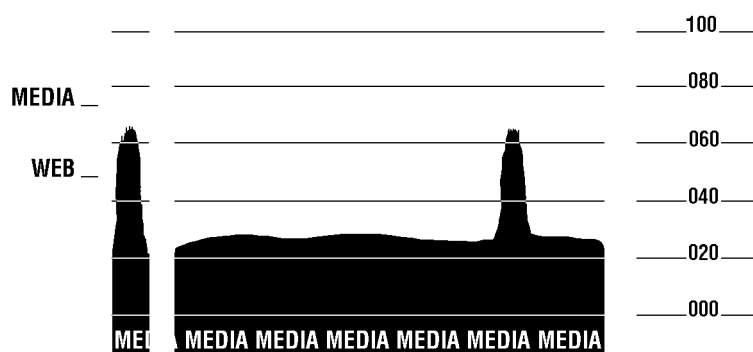


Figure 2-19. Sample Media Profile

Setup Software

To create labels, you must decide whether you will use ZPL II or commercial label preparation software. To use ZPL II, refer to the *ZPL II Programming Guide* (Zebra part number 46469L). If you choose to use a commercial label preparation software, follow the installation instructions included in the package.

Operate Printer

To create a label for the Zebra PA400, you may either use a commercial label preparation system software, such as Zebra BAR-ONE, to create the label format or write one in ZPL II, which is Zebra's programming language for creating labels. If you are using commercial label preparation software, refer to the software's help files or users guide. If you are using ZPL II to format your labels, ensure that you have a copy of the *ZPL II Programming Guide* (Zebra part number 46469L).

Adjust Darkness

If using commercial label preparation software, adjust the relative darkness setting as indicated by the software manufacturer. If ZPL II is being used, send the ^MD (Media Darkness) or ~SD (Set Darkness) command (see the ZPL II Programming Guide for the complete command syntax).

Adjust Printhead Pressure

Printhead pressure needs to be adjusted if print darkness is inconsistent across the label, if thick or thin label stock is being used, or if the registration of narrow media is a problem.



Note • Sliding the printhead pressure adjuster toward the back of the printer increases the pressure. Sliding it toward the front of the printer decreases the pressure.

If the labels darkness is uneven or the image distorted:

1. Refer to Figure 2-20. Slide the printhead pressure adjuster toward the rear of the printer until it stops at the next setting.
2. Print another test label. If the image remains irregular, repeat step 1.

If the printing on the label is too dark, reverse the above procedures.

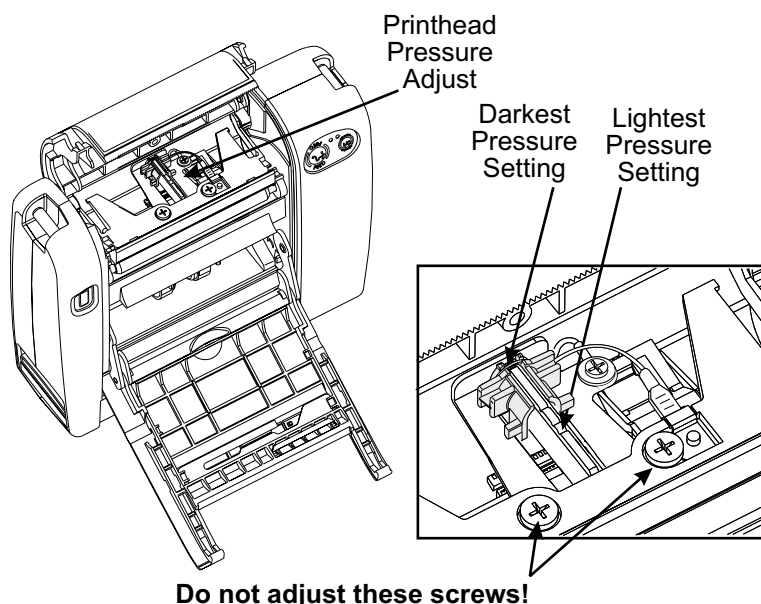


Figure 2-20. Printhead Pressure Adjustment

Adjust Faststrap

Convert to a Shoulder Strap

1. Refer to Figure 2-21. With the front of the printer facing you, unwrap the padded handle by lifting up the loose end of the handle.
2. Unlatch the buckle by squeezing both sides of the fastener.
3. Pull up the padded handle.
4. Wrap and secure the padded handle around the strap.

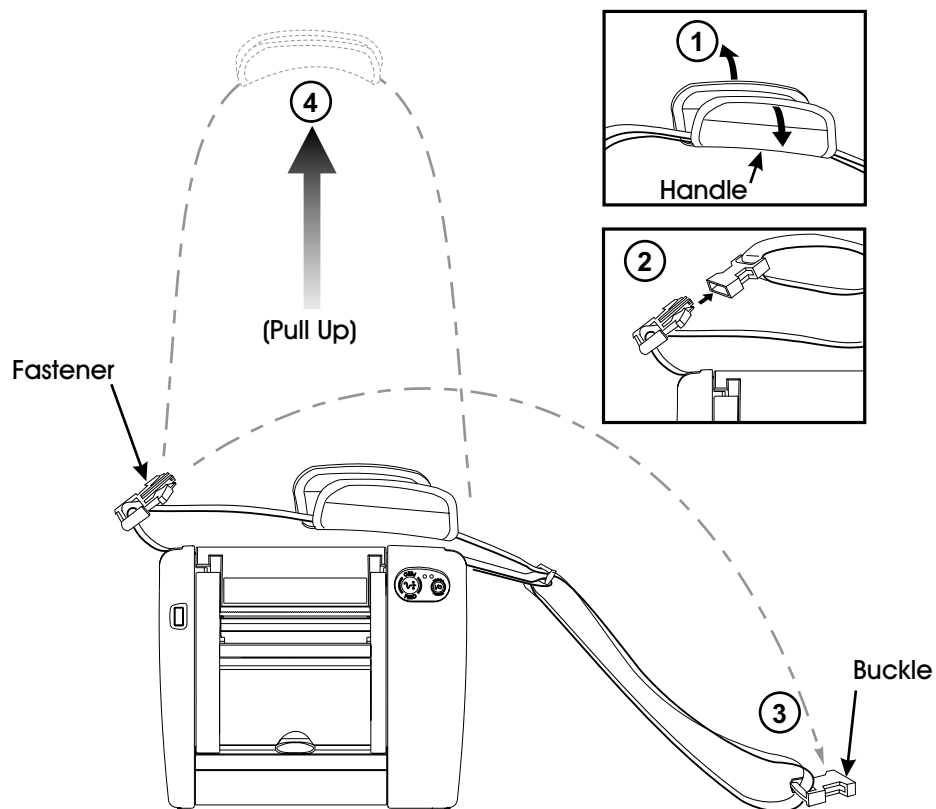


Figure 2-21. Convert to a Shoulder Strap

Convert to a Hand Strap

1. Refer to Figure 2-22. With the front of the printer facing you, unwrap the padded handle by lifting up the loose end of the handle.
2. Pull the buckle to the right until the strap is taut.
3. Latch the buckle by inserting the fastener into the buckle.
4. Wrap and secure the padded handle around the strap.

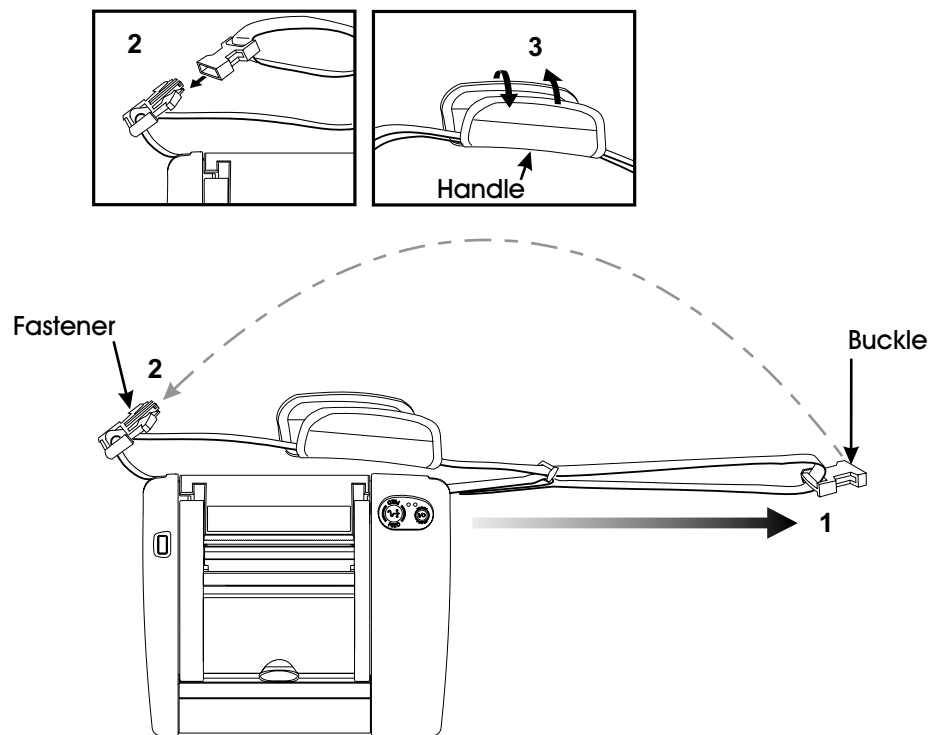


Figure 2-22. Convert to a Hand Strap



Section 3 Troubleshooting

Use Table 3-1 to match your printer's LED status to the chart. The last column of Table 3-1 gives a number to refer to in Table 3-2 on page 3-2. Table 3-3 on page 3-3 lists print quality problems that may or may not have any trouble indication from the LEDs. Tables 3-2 and 3-3 Troubleshooting Charts list the most common problems that may be encountered when operating the *PA/PT40x* printer.

Troubleshoot

LEDs

Table 3-1. LED Troubleshooting Chart

LED Status		Is the printer paused?	On Table 3-2 refer to:
Error LED (Orange)	Power LED (Green)		
Off	Off	Yes	1
Flashing	On	Yes	2
Double Flashing	On	Yes	3
On	On	No	4
On	On	Yes	5
Off	Flashing	No	6
Alternate Flashing		Yes	8
Simultaneous Flashing		Yes	2 and 6
On	Flashing	No	4 and 6
On	Flashing	Yes	5 and 6
Double Flashing	Flashing	Yes	3 and 7

Table 3-2. LED Troubleshooting Resolution Chart

#	Diagnosis	Action
1	Printer is not receiving power.	Press On (I).
		Ensure the battery is fully charged and properly installed. Try another fully charged battery.
		Membrane switch defective.
		Power supply board defective.
		Main logic board defective.
2	Printhead is open.	Close the top cover and media access door.
	Media is out.	Load a roll of media.
3	Printer is paused.	Press FEED to resume printing.
4	Printhead is under temperature.	Continue printing while the printhead reaches the correct operating temperature.
5	Printhead is over temperature.	Printing automatically stops until the printhead or battery returns to an acceptable printing temperature.
	Battery is over temperature.	
6	Battery is under voltage (level 1).	Wait until the current label finishes printing, then plug the battery charger into the printer. You do not have to turn the printer off in order to do this.
7	Battery is under voltage (level 2).	The battery may not have enough power to print the next label and may reset the printer, losing formats in the printer. Plug the battery charger into the printer. After the battery is charged, press FEED .
8	Flash memory is not programmed.	Flash memory needs to be reprogrammed or memory board needs to be replaced.

Table 3-3. Print Quality Chart

Diagnosis	Action
No print on the label.	Ensure that direct thermal media is loaded into the printer.
	Ensure the media is loaded correctly.
	Ensure the printer is being used within operational limits of between 32°F and 104°F (0°C and 40°C).
Printed image does not look right.	Print darkness needs to be adjusted.
	Printhead is dirty. Clean the printhead.
	Printhead pressure needs to be adjusted.
	The media being used is incompatible with the printer. Be sure to use Zebra-recommended media for your application.
	Battery voltage is low. Charge or replace battery.
	Printhead defective. Replace printhead.
Long tracks of missing print (blank vertical lines) on several labels.	Printhead is dirty. Clean the printhead.
	Print element is damaged. Replace the printhead.
Misregistration of labels (printing does not start at the top of the label) and misprint of one to three labels.	Media may not be threaded under the media guides.
	Printhead pressure needs to be adjusted.
	Printer needs to be recalibrated.
	The correct media sensor may not be activated. In manual calibration, select the media sensing method for the labels you are using (refer to your label preparation software users guide).
A label format was sent, but not recognized by the printer.	Ensure the printer was not in Pause Mode.
	The communication parameters are incorrect. Ensure the correct communication ports on the computer are selected. Verify the printer and computer are using the same handshake. Ensure the baud rates of the printer and computer match.
	Ensure data cable is a null modem cable and installed correctly. Replace if defective.
	Printer or computer serial ports are defective.
	If LEDs are on or flashing, check Table 3-1 on page 3-1.

Factory Assistance

Should you encounter any problem that cannot be corrected with the aid of this manual, and you have Internet access, check out ZIP Support at <http://support.zebra.com>. If you cannot solve your problem via ZIP Support or do not have Internet access, contact your Distributor or Zebra Technologies' Technical Support Department to minimize or avoid printer downtime.

ZIP Support

- Questions can be identified, diagnosed, and resolved all in one brief, easy, on-line session.
- ZIP Support is updated regularly by Zebra corporate product experts, guaranteeing the most comprehensive, timely product information available.
- High-speed, accurate, intuitive database utilizes text and graphics.
- Available any time, all time zones, 24 hours a day, 365 days a year

Technical Support

Zebra Technologies
Mobile Printer Center of Excellence
Phone: +1 401.739.5900
Fax: +1 401.732.0808
Email risupport@zebra.com

Zebra Technologies Europe Limited, UK
Phone: +44 (0) 1494 7682984
Fax: +44 (0) 1494 768210
Email tseurope@zebra.com

Repair Service Department

For in factory service and repair.

Zebra Technologies
Mobile Printer Center of Excellence
Phone: +1 401.739.5900
Fax: +1 401.732.0808

Zebra Technologies Europe Limited, UK
Phone: +44 (0) 1494 7682984
Fax: +44 (0) 1494 768210
RMA
Request ukrma@zebra.com

Returning Equipment

A Return Materials Authorization (RMA) number is required for all equipment being returned. Contact Zebra Technologies' Technical Support Department to obtain an RMA number. Equipment returned for service without prior authorization may be refused.

Whenever possible, use the original shipping container. Should it become necessary to ship your printer, carefully pack the printer in a suitable container to avoid damage during transit. Enclose a note describing the failure with the unit. Replacement shipping containers can be ordered by contacting Zebra Technologies' Technical Support Department.

If other containers are used, be sure to use packaging material similar to the original factory packaging. Remove all media from the printer. Enclose the unit in a protective, dustproof bag and ensure the unit floats in an outer carton of shock-absorbing material.

Section 4 Maintenance

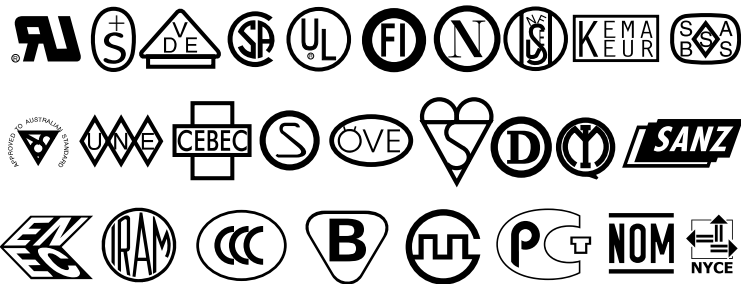
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Equipment Safety Tips



- ☐ After reviewing each procedure, place a check in the box.
- ☐ The AC power plug and IEC 320 connectors on all Zebra printers must bear the certification mark of at least one international safety organization listed below.



- ☐ Unless indicated otherwise, turn the power Off (O) before performing any maintenance procedures to the printer.
- ☐ Always follow proper electrostatic safety precautions when removing, handling, and replacing all printed circuit boards and integrated circuits.
- ☐ Zebra printers comply with international regulations governing radiated emissions when using fully shielded data cables. Data cables must be fully shielded and fitted with metal or metalized connector shells. Required Shielded data cables and connectors prevent radiation and reception of electrical noise. Use of unshielded data cables may increase radiated emissions above the regulated limits.
- ☐ Avoid direct contact with the printhead elements. Dirt and moisture from the skin can cause corrosion and prematurely shorten the printhead life.



Equipment Safety Tips (Continued)

- ☐ To ensure optimum printhead life, observe proper electrostatic safety precautions (for example ESD wrist straps) when removing, handling, and replacing the printhead.
- ☐ Nickel Cadmium (Ni-Cd) must be recycled or disposed of properly. They must not be disposed of in municipal waste. For recycling information in the United States and Canada, please call 1-800-8-BATTERY.
- ☐ Zebra recommends using solvent containing 90% isopropyl alcohol, 10% distilled water for cleaning:
 - Printheads
 - Peel-Off edge
 - Tear blade
 - Platen rollers
 - Media path
- ☐ Ribbons used in thermal transfer printers must be as wide as or wider than the media. If the ribbon is narrower than the media, areas of the printhead will be unprotected and subject to premature wear.
- ☐ Avoid dropping or banging the printer.
- ☐ Avoid direct contact with the printhead elements. Injury can occur if elements are hot.

Personal Safety Tips

- ☐ Danger of an explosion exists if the Ni-Cd battery is discharged incorrectly.
- ☐ Do not wear any jewelry (rings, watches, etc.) or loose clothing when servicing the printers.
- ☐ Beware of pinch points on the printers. Be especially careful of:
 - Opening and closing covers
 - Printhead
 - Platen roller
- ☐ Wear protective eyewear when removing E-rings, C-clips, and springs.
- ☐ For personal and equipment safety, use only Zebra-supplied and-approved battery chargers and power supplies.





Preventive Maintenance Schedule

Clean

Caution: Do not touch the print elements on the printhead. Dirt and moisture from hands can prematurely shorten printheads life.

Table 4-1. Clean Schedule

Area	Method	Interval
 Note • You do not need to turn the printer off prior to cleaning the Printhead.		
Printhead	Use 90% isopropyl alcohol on a cotton swab to clean the print elements from end to end. (The print elements are the thin wires on the printhead).	After every five rolls of media.
Platen Roller	With the power turned off, rotate the platen roller and clean it thoroughly with 90% isopropyl alcohol and a cotton swab.	
Peel Bar	Open the media access door and thoroughly clean the peel-off edge with 90% isopropyl alcohol on a clean, lint free cloth.	
Tear Blade	Clean it thoroughly with 90% isopropyl alcohol and a cotton swab.	As needed.
 Note • Do not adjust or remove the two screws on the printhead.		
Head-Open Sensor	Use 90% isopropyl alcohol on a cotton swab to clean under the screw, on the printhead head-open sensor, as shown in Figure 4-1.	As needed.
Exterior	Water-dampened rag	As needed.
Interior	Brush/air blow	As needed.

Battery Maintenance

Check battery contacts and keep clean of corrosion and grime. Clean contacts with 90% isopropyl alcohol and a cotton swab.

Batteries should be completely discharged once per week. To discharge, run the printer until you get a battery under voltage—level 1 indication (Error LED off and Power LED flashing). Follow the procedures in Charge Battery on page 2-3 for recharging the battery.

Lubrication

Caution: No lubricating agents of any kind should be used on this printer! Some commercially available lubricants will damage the finish and the mechanical parts.

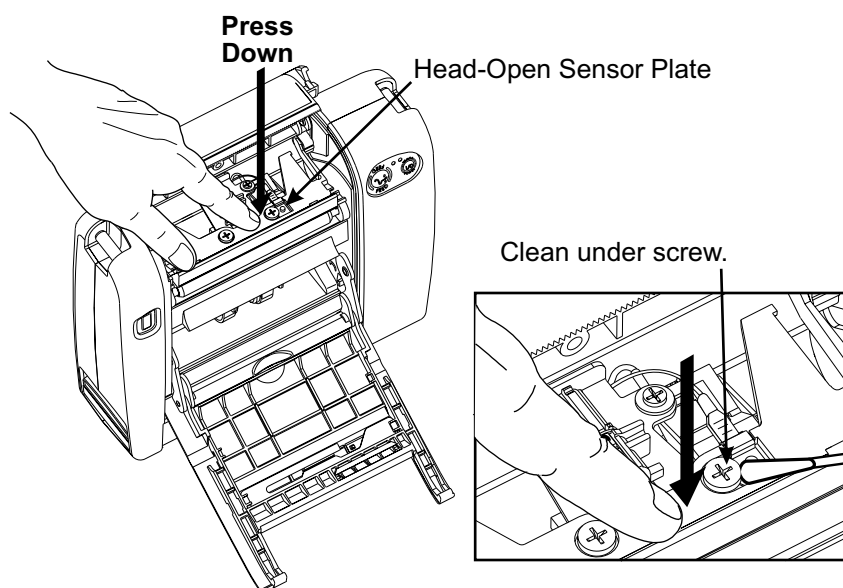


Figure 4-1. Clean Head-Open Sensor

Corrective Maintenance**Tools Required**

Phillips Screwdrivers AntiStatic Mat
Flat-Blade Screwdriver, 1/4 in. AntiStatic Wrist Strap

Part and Assembly Identification

Use Figure 4-2 when identifying printer parts or assemblies for troubleshooting.

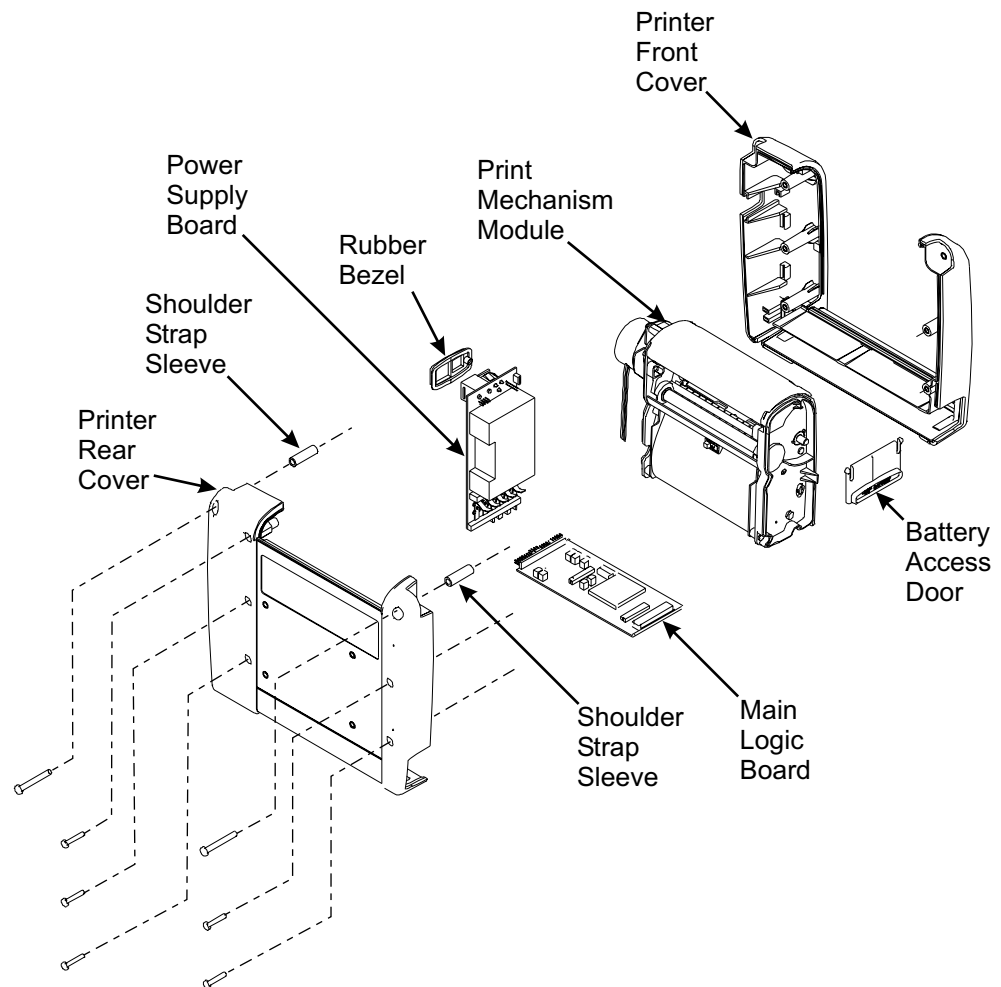


Figure 4-2. Identify Parts and Assemblies

Remove/Install Shoulder Strap

Remove Shoulder Strap

1. Turn the printer Off (O). Disconnect the battery charger.
2. Lay the printer on a flat surface with the back of the printer facing up.
3. Remove the two shoulder strap screws indicated in Figure 4-3.
4. Remove the shoulder strap.



Note • If the shoulder strap is not to be replaced or reinstalled on the printer, the shoulder strap sleeves must be removed from the strap loops. Put the shoulder strap sleeves back between the printer covers and reinstall the screws.

Install Shoulder Strap

1. Turn the printer Off (O). Disconnect the battery charger.
2. Lay the printer on a flat surface with the back of the printer facing upwards.
3. Remove the two shoulder strap screws indicated in Figure 4-3.
4. Slide one shoulder strap sleeve into each of the loops at both ends of the shoulder strap.
5. Slide the buckle end of the shoulder strap, with the shoulder strap sleeve inserted, between the front and rear cover where you removed the right shoulder strap screw (facing the rear of printer). Replace the screw.
6. Slide the other end of the shoulder strap, with the shoulder strap sleeve inserted, between the front and rear cover where you removed the second screw. Replace the screw.
7. To adjust the strap length, follow the procedures in Adjust Faststrap on page 2-20.

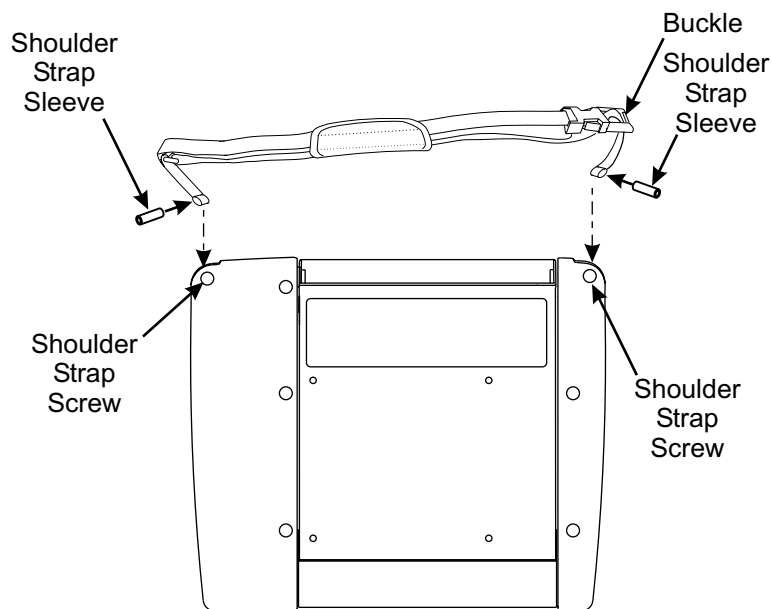


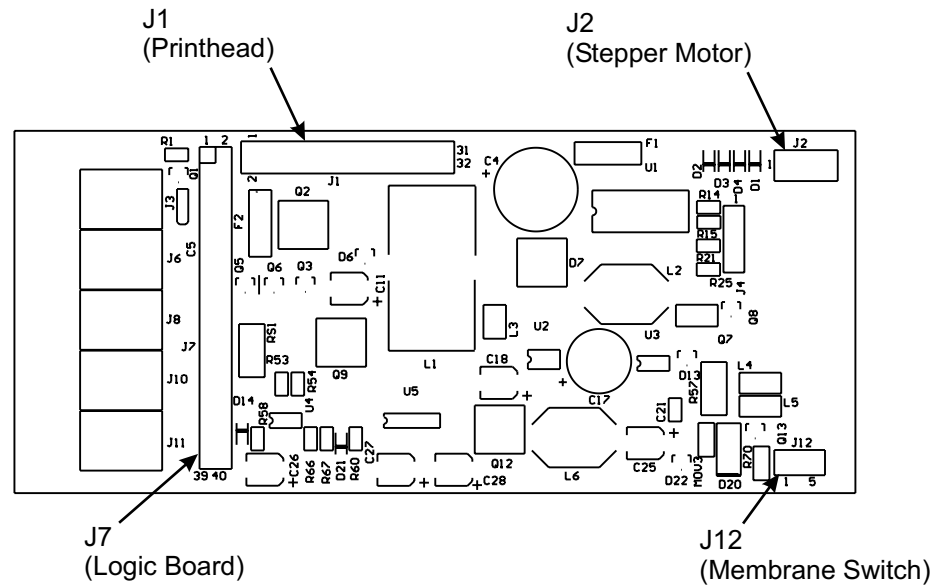
Figure 4-3. Remove/Install Shoulder Strap

Disassemble/Assemble Printer**Caution:**

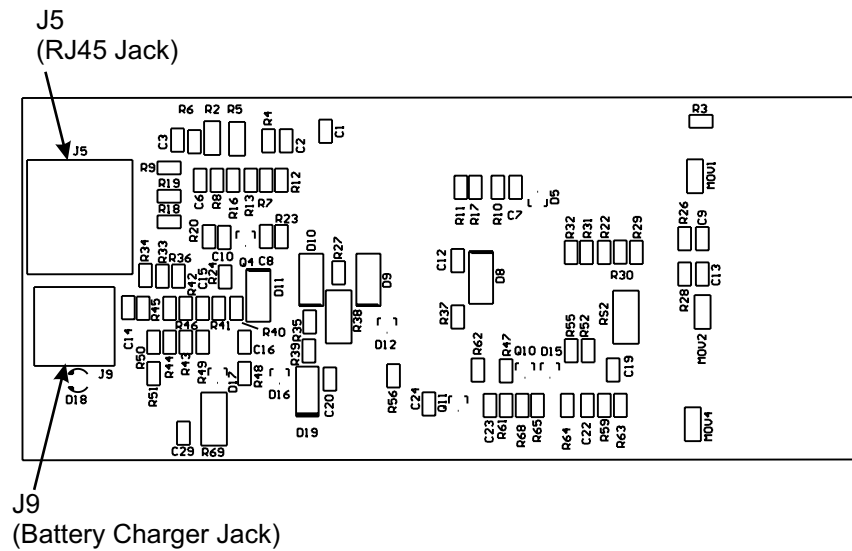
Observe proper electrostatic safety precautions when removing, handling, and replacing printed circuit boards.

Disassemble Printer

1. Turn the printer Off (O). Disconnect the battery charger.
2. Slide the battery compartment door open and remove the battery.
3. Lay the printer on a flat surface with the back of the printer facing up.
4. Remove the two shoulder strap screws indicated in Figure 4-3. Place the shoulder strap, two shoulder strap sleeves, and two shoulder strap screws to the side.
5. Remove the five cover mounting screws.
6. Lift the rear cover off and place it aside.
7. Refer to Figure 4-4. Disconnect J2 (motor harness) and J1 (printhead harness) from the power supply board.
8. Refer to Figure 4-5. Grab the print mechanism module by the access door top. Pivot it upward (the bottom of the print mechanism module is still inside the printer front cover) and lift straight up. Place the print mechanism module on the antistatic mat.
9. Refer to Figures 4-4 and 4-5. Carefully lift the power supply board and main logic board out enough to get access to J12 (membrane switch ribbon cable).
10. Remove J12 (membrane switch ribbon cable).
11. Place both boards on the antistatic mat.
12. Refer to Figure 4-7. Lift the battery access door up and out of the front cover.



Front



Back

Figure 4-4. Power Supply Board Layout

Reassemble Printer

1. Refer to Figure 4-4. Replace J12 (membrane switch ribbon cable).
2. Ensure the contacts on the membrane switch ribbon cable face away from the edge of the main logic board, where J12 is found. Reinstall the membrane switch ribbon cable into J12.
3. Refer to Figure 4-5. Slide the power supply board and main logic board into the front cover, ensuring the rubber bezel slides into the slots in the front cover.
4. Refer to Figure 4-6. Place the print mechanism, with the media access door facing down, into the front cover by holding it at the top by the access door. Slide the bottom of the print mechanism into the front cover first.
5. Refer to Figure 4-4 and replace J2 (motor harness) and J1 (printhead harness). J2 and J1 are keyed and will fit only one way. Do not force them into the connectors.
6. Refer to Figure 4-12. Route all harnesses to avoid pinching and screw posts.
7. Refer to Figure 4-7 on page 4-13. Ensure the battery access door is in the slot of the front cover with the flat side facing in.
8. Replace the cover and shoulder strap.
9. Install a battery, load the media, and test the unit. Connect a battery charger if necessary.

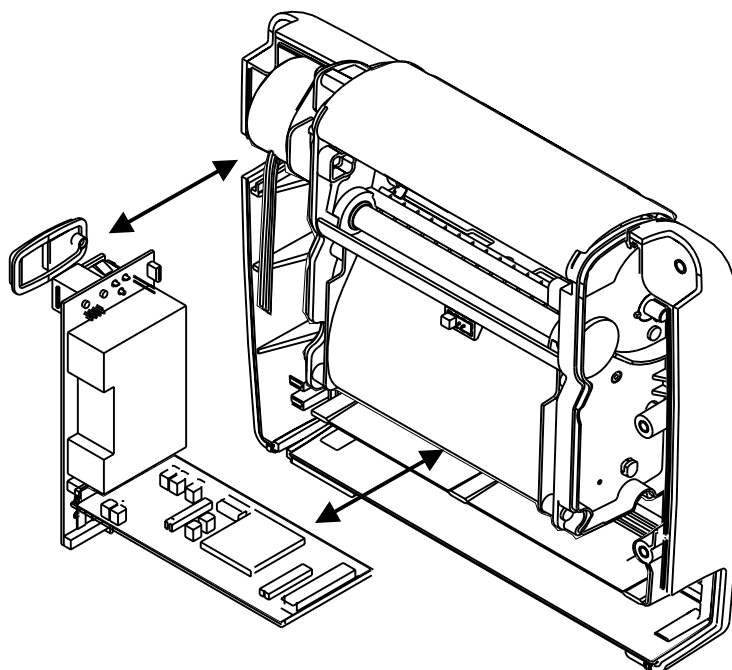


Figure 4-5. Remove/Install Power Supply Board and Main Logic Board

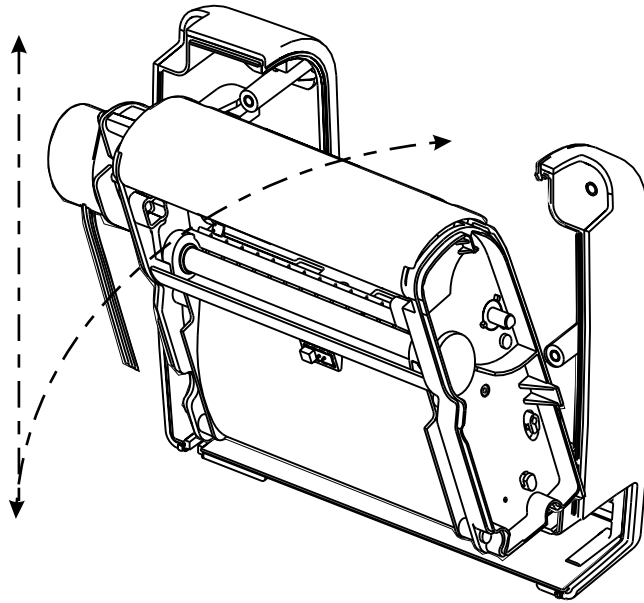


Figure 4-6. Remove/Install Print Mechanism Module

Route Battery Access Door Replace

1. Turn the printer Off (O). Disconnect the battery charger.
2. Slide the battery compartment door open and remove the battery.
3. Lay the printer on a flat surface with the back facing up.
4. Remove the two shoulder strap screws indicated in Figure 4-3 on page 4-8. Set the shoulder strap, two shoulder strap sleeves, and two shoulder strap screws aside.
5. Remove the cover mounting screws.
6. Lift the rear cover off and set it aside.
7. Refer to Figure 4-7. Lift the battery access door up and out of the front cover.
8. Insert the new battery access door, ensuring it is in the slot of the front cover with the flat side facing in.
9. Refer to Figure 4-8. Ensure all harnesses are routed to avoid pinching and screw posts.
10. Replace the cover and shoulder strap.
11. Install a battery, load the media, and test the unit. Connect a battery charger if necessary.

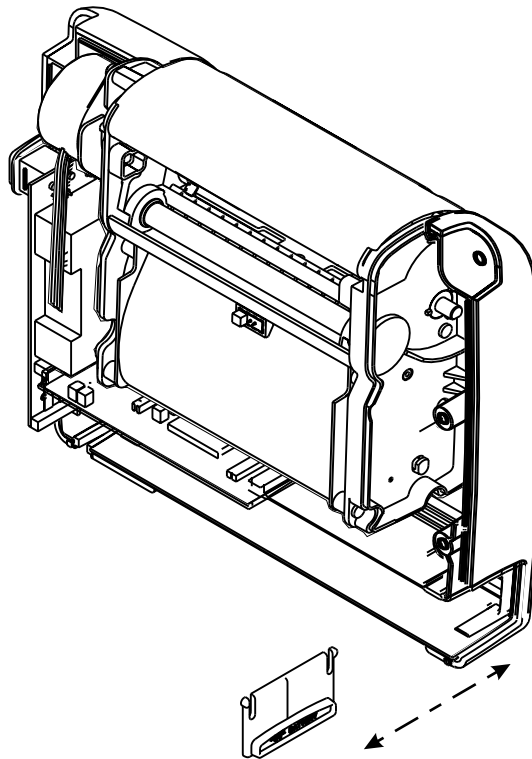


Figure 4-7. Remove/Install Battery Access Door

Replace Main Logic Board



Caution:

Observe proper electrostatic safety precautions when removing, handling, and replacing printed circuit boards.

1. Turn the printer Off (O). Disconnect the battery charger.
2. Slide the battery compartment door open and remove the battery.
3. Lay the printer on a flat surface with the back facing up.
4. Remove the two shoulder strap screws indicated in Figure 4-3. Set the shoulder strap, two shoulder strap sleeves, and two shoulder strap screws aside.
5. Remove the cover mounting screws.
6. Remove the rear cover and set aside.
7. Refer to Figure 4-5. Lift the power supply and main logic boards out enough to clear the front cover.
8. Refer to Figure 4-6. Hold the power supply board firmly with one hand, and gently pull the main logic board away from the power supply board.
9. Hold the power supply board firmly with one hand, and gently push the replacement main logic board 40-pin plug into the power supply board 40-pin receptacle. The bottom (noncomponent side) of the main logic board faces the battery contacts on the power supply board.

10. Refer to Figure 4-5. Reinstall the power supply board and main logic board in the front cover, ensuring the rubber bezel slides into the slots in the front cover.
11. Refer to Figure 4-8. Route all harnesses to avoid pinching and screw posts.
12. Refer to Figure 4-7. Ensure the battery access door is in the slot of the front cover with the flat side facing in.
13. Replace the cover and shoulder strap.
14. Reinstall the battery. Connect a battery charger if necessary.



Note • Perform Step 15 on a *PT40x* only

15. Perform the procedure Calibrate Ribbon Sensor on page 2-18.
16. load the media, and perform an auto-calibration.

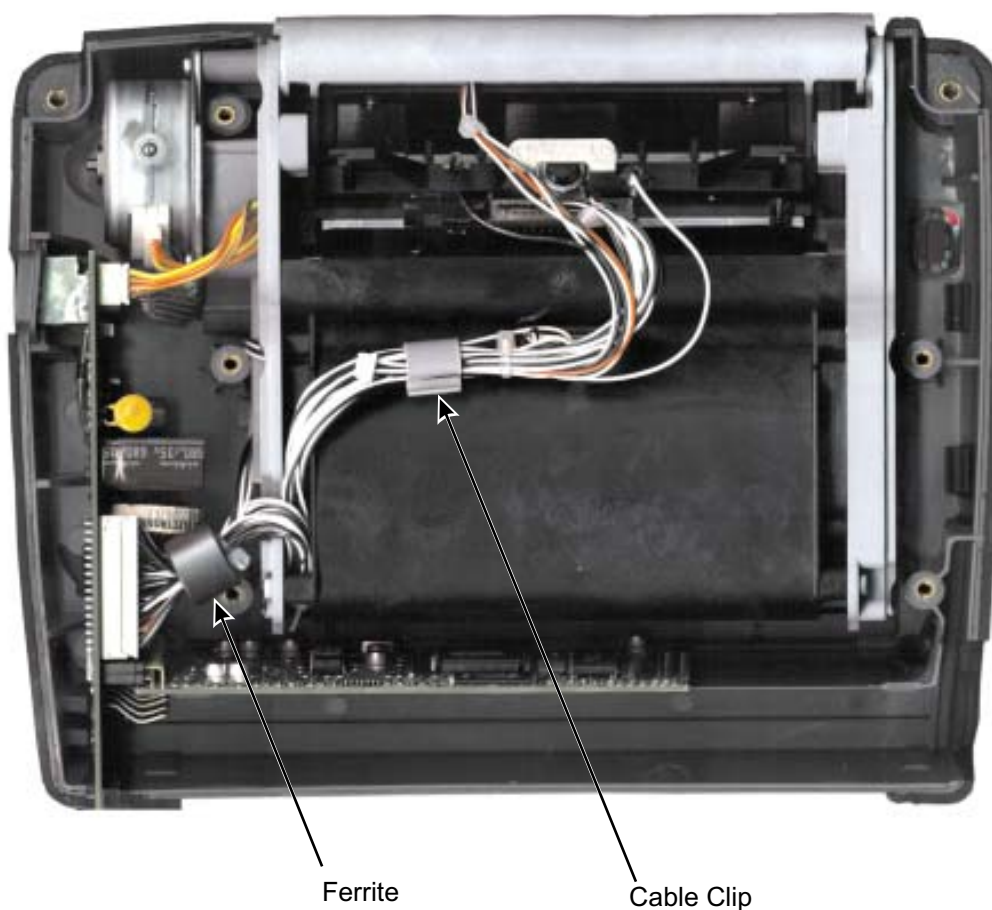


Figure 4-8. Route Cable Harness

Replace Power Supply Board



Caution:

Observe proper electrostatic safety precautions when removing, handling, and replacing printed circuit boards.

1. Turn the printer Off (O). Disconnect the battery charger.
2. Slide the battery compartment door open and remove the battery.
3. Lay the printer on a flat surface with the back facing up.
4. Remove the two shoulder strap screws indicated in Figure 4-3. Set the shoulder strap, two shoulder strap sleeves, and two shoulder strap screws aside.
5. Remove the cover mounting screws.
6. Remove the rear cover and set it aside.
7. Refer to Figure 4-4 on page 4-10. Disconnect J2 (motor harness) and J1 (printhead harness) from the power supply board.
8. Refer to Figure 4-6 on page 4-12. Grasp the print mechanism module near the access door top. Pivot it upward (the bottom of the print mechanism module is still inside the printer front cover) and lift straight up. Set the print mechanism module on the antistatic mat
9. Refer to Figure 4-5. Lift the power supply and main logic boards out enough to clear the front cover.
10. Remove J12 (membrane switch ribbon cable).
11. Refer to Figure 4-6. Hold the power supply board firmly with one hand, and gently pull the main logic board away from the power supply board.
12. Remove the rubber bezel from the battery/communication jacks on the power supply board.
13. Place the rubber bezel on the replacement power supply board.
14. Hold the power supply board in one hand, and with the other hand gently push the main logic board 40-pin plug into the power supply board 40-pin receptacle. The bottom (noncomponent side) of the main logic board faces the battery contacts on the power supply board.
15. Refer to Figure 4-4 on page 4-10. Replace J12 (membrane switch ribbon cable).
16. Refer to Figure 4-7. Ensure the battery access door is in the slot in the front cover with the flat side facing in.
17. Refer to Figure 4-5. Reinstall the power supply board and main logic board into the front cover, ensuring the rubber bezel slides into the slots in the front cover.
18. Refer to Figure 4-6 on page 4-12. Place the print mechanism, with the media access door facing down, into the front cover by holding it at the top near the access door. Slide the bottom of the print mechanism in first.
19. Refer to Figure 4-4 on page 4-10 and replace J2 (motor harness) and J1 (printhead harness). J2 and J1 are keyed and fit only one way. Do not force them into the connectors.
20. Refer to Figure 4-8. Route all harnesses to avoid pinching and screw posts.

21. Refer to Figure 4-7. Ensure the battery access door is in the slot in the front cover with the flat side facing in.
22. Replace the cover and shoulder strap.
23. Reinstall the battery. Connect a battery charger if necessary.

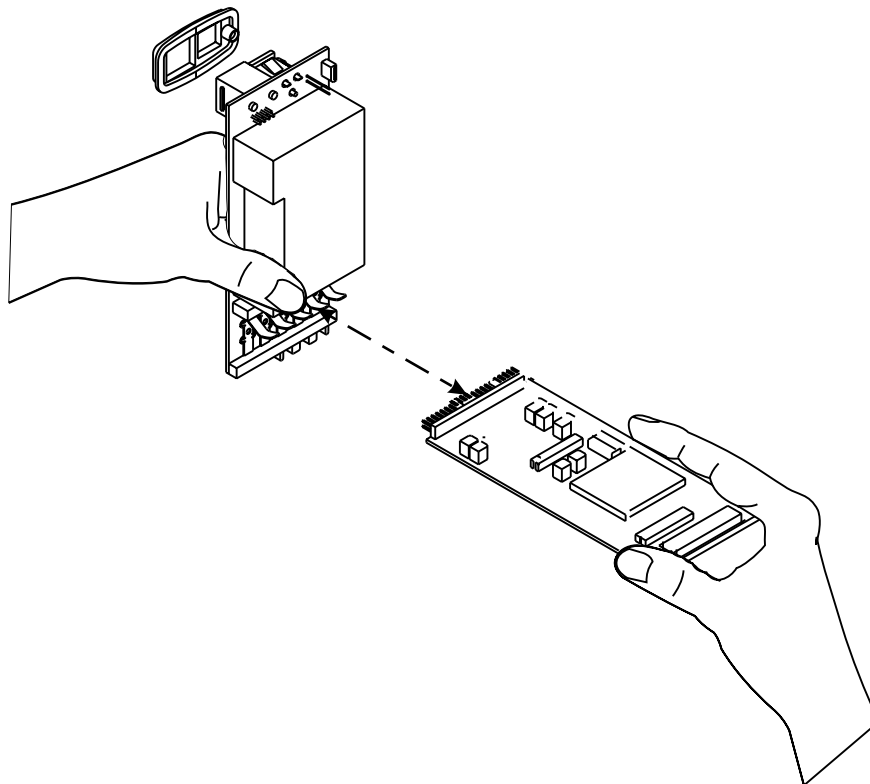


Figure 4-9. Disassemble/Assemble Power Supply Board & Main Logic Board

Replace Printhead Assembly



Caution:

Do not touch the print elements on the printhead. The print elements may be hot and will burn the skin.

Caution:

Do not touch the print elements on the printhead. Dirt and moisture from the hands can prematurely shorten the printhead life.



Note • The printhead assemblies are factory adjusted. Other than adjusting the printhead pressure for media, do not make any adjustments. If the screws mounting the printhead are adjusted, it can cause damage, premature printhead failure, and poor print quality.

1. Turn the printer Off (●). Disconnect the battery charger.
2. Slide open the battery compartment door and remove the battery.
3. Open the media access door and remove any media.
4. Stand the printer on a flat surface with the front facing you.
5. Refer to Figure 4-10. Remove the printhead assembly by first lifting the printhead off the platen roller. Gently bend in one of the printhead pivot arms. Carefully pull the printhead assembly out far enough to gain access to the cabling.
6. Refer to Figure 4-11. Loosen, but do not remove, the screw securing the ground wire(s). Remove the ground wire(s).
7. Carefully slide the head-open switch wire off of the spade lug on the printhead.
8. Refer to Figure 4-12. Carefully slide the 16-pin connector off of the printhead.
9. Refer to Figure 4-11. (PT400 only) Carefully slide the 4-pin connector off of the ribbon sensor board.
10. Place the replacement printhead assembly into the print mechanism module by reversing steps 5 through 9. Ensure the 16-pin connector on the printhead, the 4-pin connector on the ribbon sensor board (PT400 only), the ground wire(s), and head-open switch wire are connected to the printhead before operating. Ensure all connections are fully seated.
11. Install a battery, load the media, and calibrate the unit. Connect a battery charger if necessary.

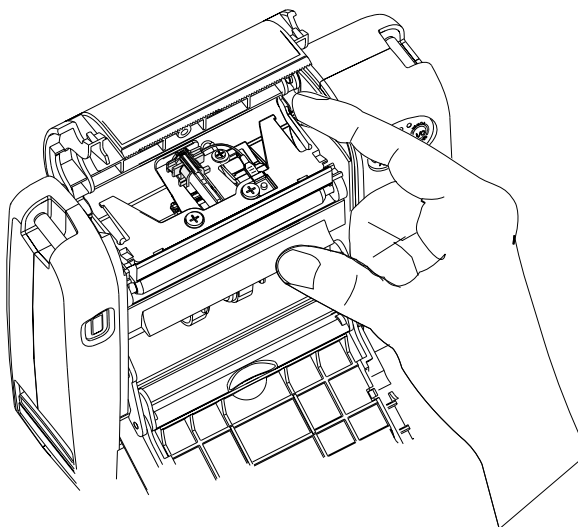


Figure 4-10. Remove/Install Printhead Assembly

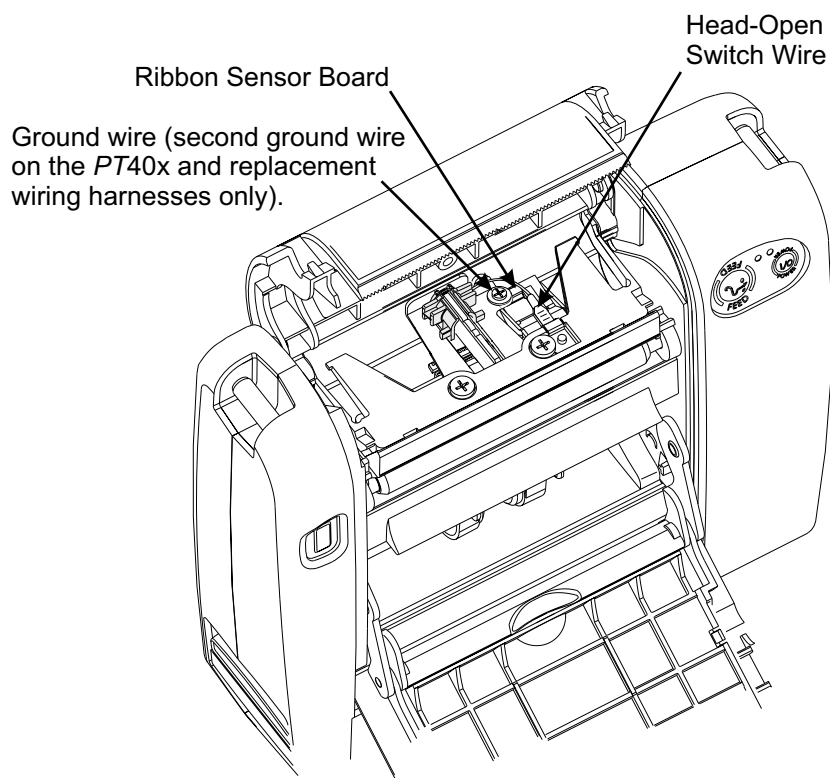


Figure 4-11. Locate Printhead Ground Wire

Replace Ribbon Sensor Board Assembly



Caution:

Do not touch the print elements on the printhead. The print elements may be hot and will burn the skin.

Caution:

Do not touch the print elements on the printhead. Dirt and moisture from the hands can prematurely shorten the printhead life.



Caution:

Observe proper electrostatic safety precautions when removing, handling, and replacing printed circuit boards.

1. Turn the printer Off (O). Disconnect the battery charger.
2. Slide the battery compartment door open and remove the battery.
3. Open the media access door and remove any media.
4. Stand the printer on a flat surface with the front facing you.
5. Refer to Figure 4-10. Remove the printhead assembly by first lifting the printhead off the platen roller. Gently bend in one of the printhead pivot arms. Carefully pull the printhead assembly out of the print mechanism module far enough to gain access to the cabling.
6. Refer to Figure 4-11. Loosen, but do not remove, the screw securing the two ground wires. Remove the two ground wires.
7. Carefully remove the head-open switch wire from the spade lug on the printhead.
8. Refer to Figure 4-12 on page 4-20. Carefully slide the 16-pin connector off the printhead.
9. Refer to Figure 4-11 on page 4-18. Carefully slide the 4-pin connector off the ribbon sensor board.
10. Refer to Figure 4-13. Remove the ribbon sensor board by sliding the tip of a 1/4 in. flat-blade screwdriver under the tab approximately 1/4 in. (6.4 mm).
11. Gently lift up on the screwdriver handle until the screwdriver is perpendicular to the printhead assembly. The ribbon sensor board slides away from the printhead assembly.
12. Refer to Figure 4-14. Slide the replacement ribbon sensor board into the printhead assembly until the tab locks into the cutout on the board.
13. Reinstall the printhead assembly into the print mechanism module by reversing steps 5 through 9. Ensure the 16-pin connector on the printhead, the 4-pin connector on the ribbon sensor board, the two ground wires, and head-open switch wire are connected to the printhead before operating. Make sure all connections are fully seated.
14. Install a battery. Connect a battery charger if necessary.
15. Perform the Calibrate Ribbon Sensor on page 2-18.
16. Load the media, and perform an Auto-Calibration on page 2-17.

1. Insert screwdriver tip between plug and receptacle.
2. Carefully twist screwdriver to pry apart.

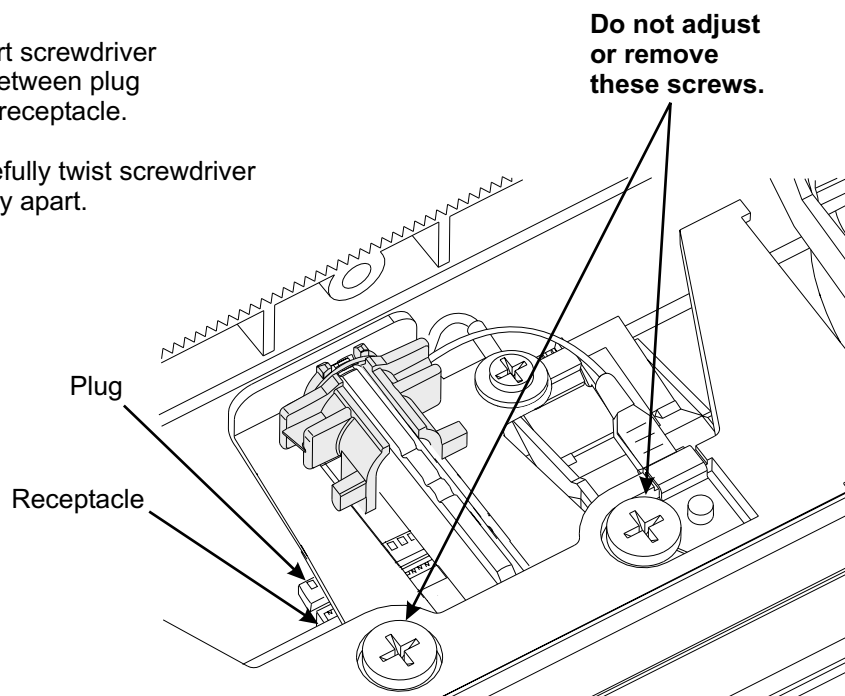


Figure 4-12. Locate Printhead 16-Pin Connector

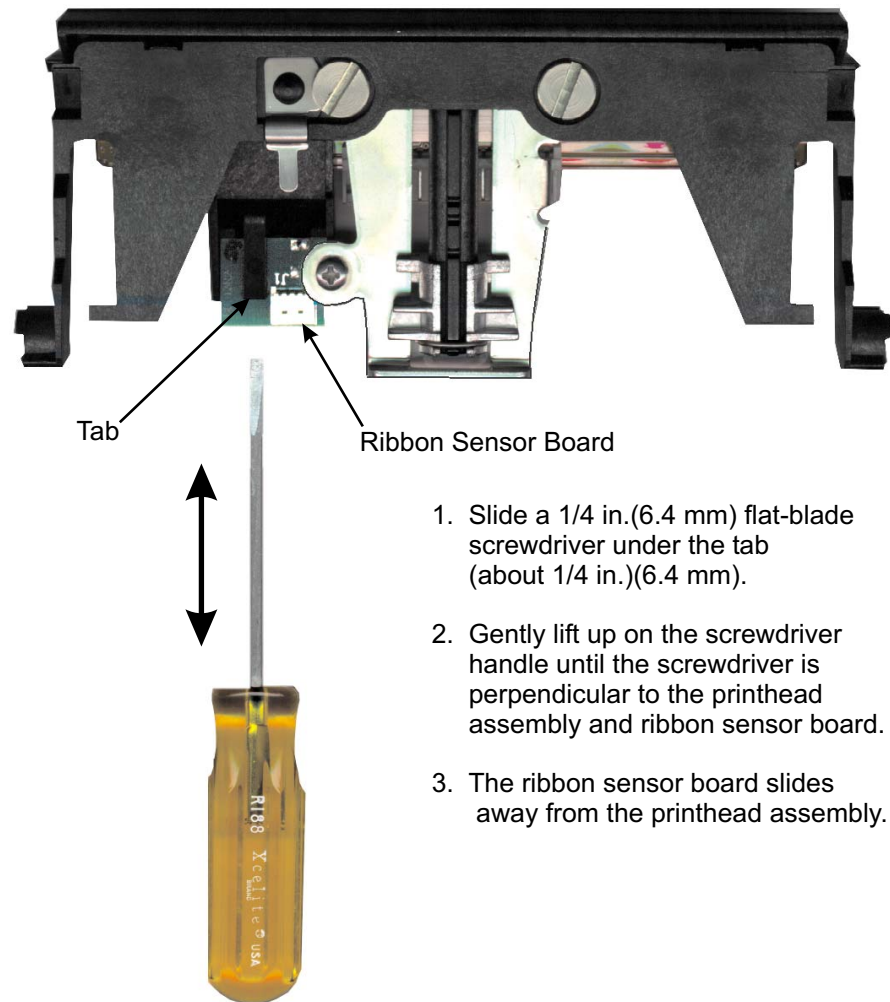


Figure 4-13. Remove Ribbon Sensor Board

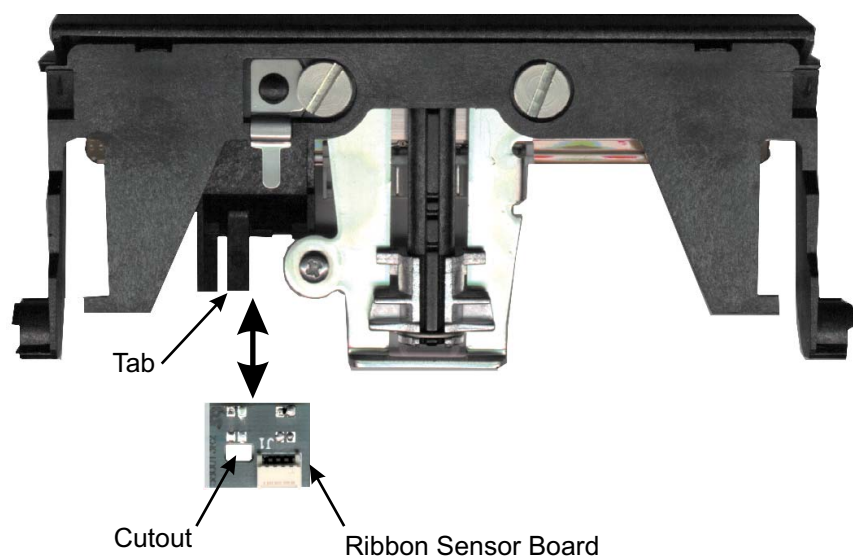


Figure 4-14. Install Ribbon Sensor Board

Replace Print Mechanism Module



Caution:

Do not touch the print elements on the printhead. The print elements may be hot and will burn the skin.

Caution:

Do not touch the print elements on the printhead. Dirt and moisture from the hands can prematurely shorten the printhead life



Caution:

Observe proper electrostatic safety precautions when removing, handling, and replacing printed circuit boards.

1. Turn the printer Off (●). Disconnect the battery charger.
2. Slide the battery compartment door open and remove the battery.
3. Open the media access door and remove any media.
4. Stand the printer on a flat surface with the front facing you.
5. Refer to Figure 4-10. Remove the printhead assembly by first lifting the printhead off the platen roller. Gently bend in one of the printhead pivot arms. Carefully pull the printhead assembly out of the print mechanism module far enough to gain access to the cabling.
6. Refer to Figure 4-11. Loosen, but do not remove, the screw securing the ground wire(s). Remove the ground wire(s).
7. Carefully slide the head-open switch wire off the spade lug on the printhead.
8. Refer to Figure 4-12. Carefully slide the 16-pin connector off the printhead.
9. Refer to Figure 4-11. (PT400 only) Carefully slide the 4-pin connector off the ribbon sensor board.
10. Set the printhead assembly on the antistatic mat.
11. Close the media access door and set the printer down with the back facing up.
12. Remove the two shoulder strap screws indicated in Figure 4-3. Set the shoulder strap, the two shoulder strap sleeves, and the two shoulder strap screws aside.
13. Remove the cover mounting screws.
14. Lift the rear cover off and set it aside.
15. Refer to Figure 4-4 on page 4-10. Disconnect J2 (motor harness) and J1 (printhead harness) from the power supply board.
16. Refer to Figure 4-6 on page 4-12. Grasp the print mechanism module near the access door front. Pivot it up (the bottom of the print mechanism module is still inside the printer cover front) and lift straight up.
17. Set the replacement print mechanism module into the front cover, with the media access door facing down, by holding it at the top near the access door. Slide in the bottom of the print mechanism first.

18. Refer to Figure 4-6 on page 4-12 and replace J2 (motor harness) and J1 (printhead harness). J2 and J1 are keyed and fit only one way. Do not force them into the connectors.
19. Refer to Figure 4-8 on page 4-14. Route all harnesses to avoid pinching and screw posts.
20. Refer to Figure 4-7 on page 4-13. Ensure the battery access door is in the slot in the front cover with the flat side facing in.
21. Replace the cover and shoulder strap.
22. Place the printhead assembly into the replacement print mechanism module by reversing steps 5 through 9. Ensure the 16-pin connector on the printhead, the 4-pin connector on the ribbon sensor board (*PT40x* only), the ground wire(s), and head-open switch wire are connected to the printhead before operating. Ensure all connections are fully seated.
23. Close and latch the print mechanism module access door.
24. Install a battery, load the media, and calibrate the unit. Connect a battery charger if necessary.

Replace Wiring Harness



Caution:

Do not touch the print elements on the printhead. The print elements may be hot and will burn the skin.

Caution:

Do not touch the print elements on the printhead. Dirt and moisture from the hands can prematurely shorten the printhead life.



Caution:

Observe proper electrostatic safety precautions when removing, handling, and replacing printed circuit boards.

1. Turn the printer Off (●). Disconnect the battery charger.
2. Slide the battery compartment door open and remove the battery.
3. Open the media access door and remove any media.
4. Stand the printer on a flat surface with the front of the printer facing you.
5. Refer to Figure 4-10 on page 4-18. Remove the printhead assembly by first lifting the printhead off the platen roller. Gently bend in one of the printhead pivot arms. Carefully pull the printhead assembly out of the print mechanism module far enough to gain access to the cabling.
6. Refer to Figure 4-11 on page 4-18. Loosen, but do not remove, the screw securing the ground wire(s). Remove the ground wire(s).
7. Carefully slide the head-open switch wire off the spade lug on the printhead.
8. Refer to Figure 4-12 on page 4-20. Carefully remove the 16-pin connector from the printhead.
9. (*PT40x* only) Carefully remove the 4-pin connector from the ribbon sensor board.

10. Set the printhead assembly on the antistatic mat. Close the media access door and place the printer face down.
11. Remove the two shoulder strap screws indicated in Figure 4-3 on page 4-8. Set the shoulder strap, the two shoulder strap sleeves, and the two shoulder strap screws aside.
12. Remove the cover mounting screws.
13. Lift the rear cover off and set it aside.
14. Refer to Figure 4-4 on page 4-10. Disconnect J2 (motor harness) and J1 (printhead harness) from the power supply board.
15. Refer to Figure 4-15. Disconnect the outer media sensor cable located in the middle rear of the print mechanism module.
16. Disconnect the inner media sensor cable on the left side frame (motor side) of the print mechanism module.
17. Grasp the print mechanism module by the media access door top (see Figure 4-6). Pivot it up (the bottom of the print mechanism module is still inside the printer cover top) and lift straight up.
18. Place the print mechanism module on a flat surface with the media access door facing up.
19. Open the media access door.
20. Refer to Figure 4-16. Using your thumbs, gently spread the two side frames of the print mechanism module apart enough for the access door top to slip off the hinge pins.
21. Remove the entire wiring harness and top access door from the print mechanism module.
22. Install the new top access door and harness into the print mechanism module and slide it against one of the hinge pins. Gently spread the side frame opposite the hinge pin engaged with the top access door. Slide the top access door into the second hinge pin.
23. Refer to Figure 4-8 on page 4-14. Install the new wiring harness in the print mechanism module.
24. Refer to Figure 4-6 on page 4-12. Place the print mechanism module into the front cover, with the media access door facing down, by holding it at the top near the media access door. Slide in the bottom of the print mechanism first.
25. Refer to Figure 4-15. Reconnect the outer media sensor cable and Inner Media Sensor cable.
26. Refer to Figure 4-4 on page 4-10 and replace J2 (motor harness) and J1 (printhead harness). J2 and J1 are keyed and fit only way. Do not force them into the connectors.
27. Refer to Figure 4-8 on page 4-14. Route all harnesses to avoid pinching and screw posts.
28. Refer to Figure 4-7 on page 4-13. Ensure the battery access door is in the slot in the front cover with the flat side facing in.
29. Replace the rear cover and shoulder strap.



Note • The replacement wiring harness assembly is designed for use on both the PA40x and PT40x. An additional ground wire leading from beneath the metal shield inside the top cover shown in Figure 5-1 on page 5-3, item 9 attaches to the ground screw on the printhead. Connect the additional ground wire to the ground screw on the printhead when using the wiring harness on the PA40x and PT40x (see Figure 4-11 on page 4-18).

30. Reinstall the printhead assembly by reversing steps 5 through 9. Ensure the 16-pin connector, 4-pin connector on the ribbon sensor board (PT400 only), two ground wires, and head-open switch wire are connected to the printhead before operating. Ensure all connections are fully seated.
31. Close and latch the print mechanism module media access door.
32. Install a battery, load the media, and calibrate the unit. Connect a battery charger if necessary.

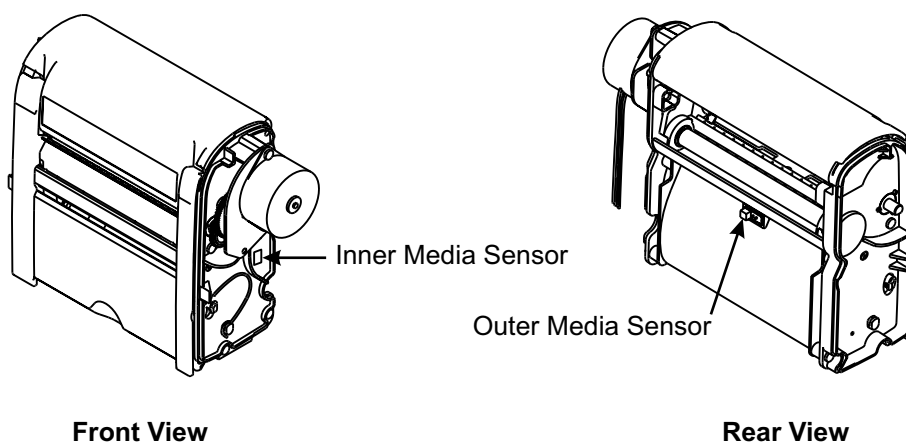


Figure 4-15. Sensor Connector Location

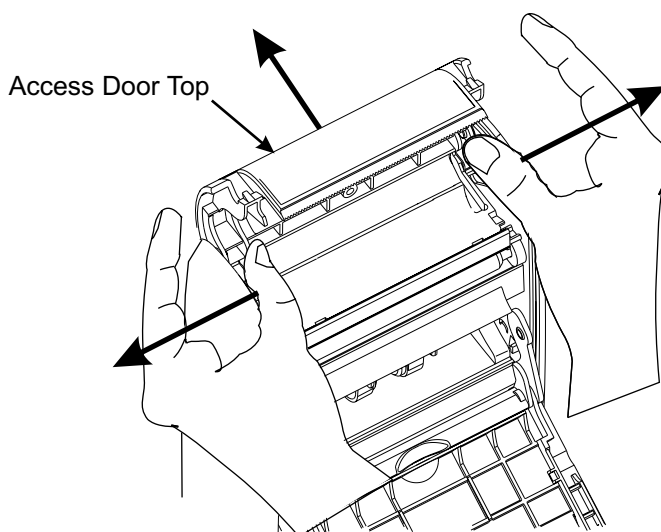


Figure 4-16. Removing the Access Door Top

Replace Membrane Switch Assembly

**Caution:**

Observe proper electrostatic safety precautions when removing, handling, and replacing printed circuit boards.

1. Turn the printer Off (O). Disconnect the battery charger.
2. Slide the battery compartment door open and remove the battery.
3. Lay the printer on a flat surface with the back of the printer facing up.
4. Remove the two shoulder strap screws indicated in Figure 4-3 on page 4-8. Set the shoulder strap, two shoulder strap sleeves, and two shoulder strap screws aside.
5. Remove the cover mounting screws.
6. Lift the rear cover off and set it aside.
7. Refer to Figure 4-4 on page 4-10. Disconnect J2 (motor harness) and J1 (printhead harness) from the main logic board.
8. Refer to Figure 4-6 on page 4-12. Grasp the print mechanism module by the access door top. Pivot it upward (the bottom of the print mechanism module is still inside the printer front cover) and lift straight up. Set the print mechanism module on the antistatic mat.
9. Refer to Figures 4-4 and 4-5 on pages 4-10 and 4-11. Carefully lift the power supply board and main logic board out enough to get access to J12 (membrane switch ribbon cable).
10. Remove J12 (membrane switch ribbon cable).
11. Place both boards on the antistatic mat.
12. Refer to Figure 4-7 on page 4-13. Lift the battery access door up and out of the top cover.
13. Refer to Figure 4-17. Turn the front cover face up and, using a 1/4 in. flat-blade screwdriver, carefully pry the defective membrane switch assembly away from the front cover.
14. Using isopropyl alcohol to clean the area on the front cover where the membrane switch assembly was located. Remove as much of the old adhesive as possible.
15. Remove the liner on the replacement membrane switch assembly. With the LEDs facing the top edge of the cover, thread the ribbon cable through the cutout in the front cover. Once in place, press around the membrane switch assembly so the adhesive makes contact with the front cover and the switch is secure. Allow time for the adhesive to dry.
16. Place the front cover face down.
17. Refer to Figure 4-4 on page 4-10. Ensure the contacts on the membrane switch ribbon cable face away from the edge of the main logic board where J12 is found. Install the membrane switch ribbon cable into J12.
18. Refer to Figure 4-5 on page 4-11. Slide the power supply board and main logic board into the front cover. Ensure the rubber bezel slides into the slots in the front cover.

19. Refer to Figure 4-6 on page 4-12. Place the print mechanism, with the media access door facing down, into the front cover by holding it at the top near the access door. Slide in the bottom of the print mechanism first.
20. Refer to Figure 4-3 on page 4-8 and replace J2 (motor harness) and J1 (printhead harness). J2 and J1 are keyed and fit only one way. Do not force them into the connectors.
21. Refer to Figure 4-8 on page 4-14. Route all harnesses to avoid pinching and screw posts.
22. Refer to Figure 4-7 on page 4-13. Ensure the battery access door is in the slot in the front cover with the flat side facing in.
23. Replace the cover and shoulder strap.
24. Install a battery, load the media, and test the unit. Connect a battery charger if necessary.

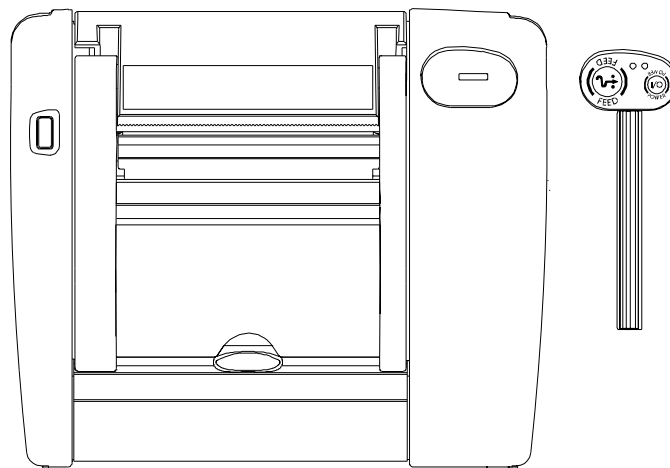


Figure 4-17. Membrane Switch Assembly

Repair Media Guide



Caution:

Do not touch the print elements on the printhead. The print elements may be hot and will burn the skin.

Caution:

Do not touch the print elements on the printhead. Dirt and moisture from the hands can prematurely shorten the printhead life.



Caution:

Observe proper electrostatic safety precautions when removing, handling, and replacing printed circuit boards.

Refer to Figure 4-18. The media guides are part of the print mechanism assembly. If they are broken, the entire print mechanism assembly must be replaced. If the media guides are simply bent out of shape, perform the procedure listed below.



Note • The printhead assembly is removed to avoid damage when bending the media guides.

1. Turn the printer Off (O). Disconnect the battery charger.
2. Slide the battery compartment door open and remove the battery.
3. Open the media access door and remove any media.
4. Stand the printer on a flat surface with the front of the printer facing you.
5. Refer to Figure 4-10 on page 4-18. Remove the printhead assembly by first lifting the printhead off the platen roller. Gently bend in on one of the printhead pivot arms. Carefully pull the printhead assembly out of the print mechanism module far enough to gain access to the cabling.
6. Refer to Figure 4-11 on page 4-18. Loosen, but do not remove, the screw securing the ground wire. Remove the ground wire.
7. Carefully disconnect the head-open switch wire from the spade lug on the printhead.
8. Refer to Figure 4-12 on page 4-20. Carefully disconnect the 16-pin connector from the printhead.
9. (PT40x only) Refer to Figure 4-11 on page 4-18. Carefully disconnect the 4-pin connector from the ribbon sensor board.
10. Using needle-nose pliers, carefully bend the media guides so the vertical portions are perpendicular to the platen roller and the horizontal portions are parallel to the roller.
11. Replace the printhead assembly into the print mechanism module by reversing steps 5 through 9. Ensure the 16-pin connector on the printhead, 4-pin connector on the ribbon sensor board (PT400 only), ground wire, and head-open switch wire are connected to the printhead before operating. Ensure all connections are fully seated.
12. Close and latch the print mechanism module media access door.

13. Install a battery, load the media, and calibrate the unit. Connect a battery charger if necessary.

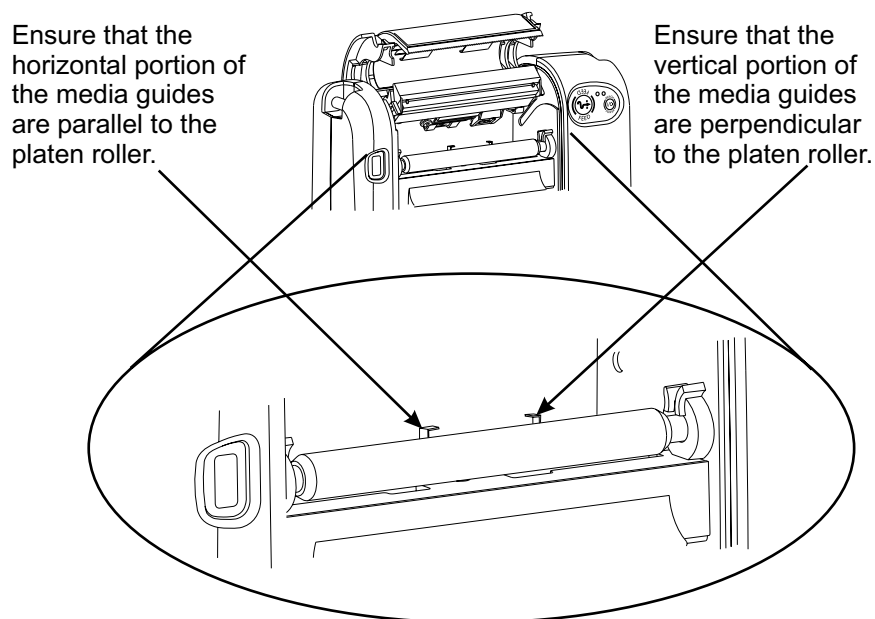


Figure 4-18. Adjust Media Guide

IrDA Board and Cable Replacement

1. Turn the printer Off (O). Disconnect the battery charger.
2. Slide the battery compartment door open and remove the battery.
3. Lay the printer on a flat surface with the back facing up.
4. Remove the two shoulder strap screws indicated in Figure 4-3 on page 4-8. Set the shoulder strap, shoulder strap sleeves, and shoulder strap screws aside.
5. Remove the rear cover mounting screws.
6. Lift the rear cover off and set it aside.
7. Refer to Figure 4-19. Unplug the IrDA cable from the IrDA board.
8. If replacing the IrDA board only, slide the IrDA board out of the printer.
9. If replacing the cable, unplug it from the main logic board, and remove it from the wire clips.
10. Replace the cable by plugging it into the IrDA board.
11. Insert the IrDA board as shown.
12. Dress the IrDA Cable and secure it with the wire clips.
13. Plug the remaining connector into the main logic board.
14. Replace the rear cover and shoulder strap.
15. Reinstall the battery, load the media, and test the unit. Connect a battery charger if necessary.

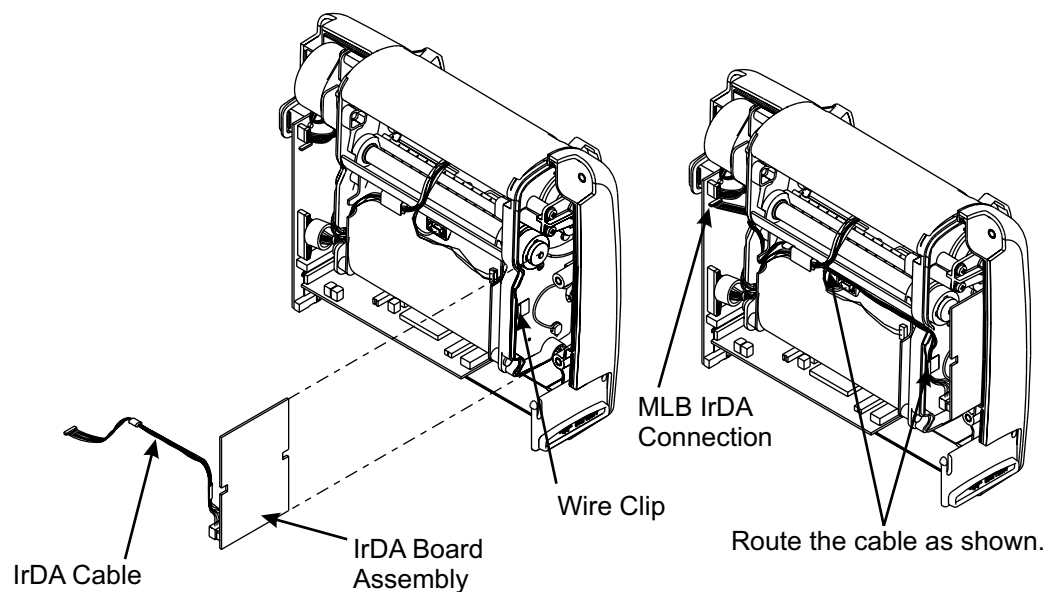
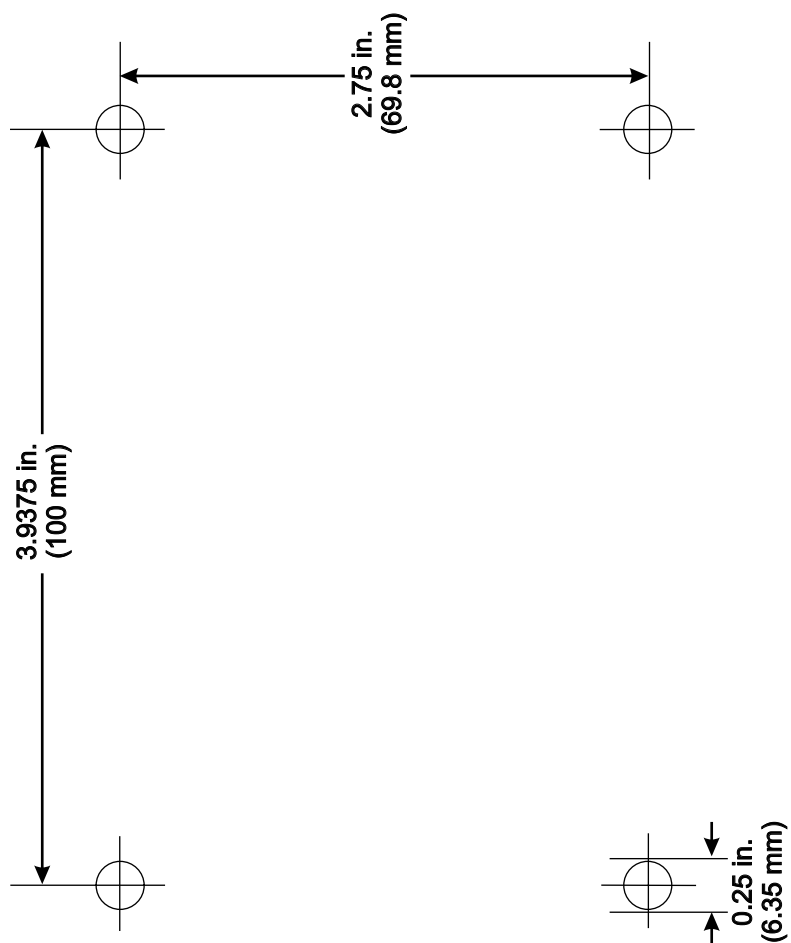


Figure 4-19. Install IrDA Cable and Board



Battery Access Door

Figure 4-20. Mounting Hole Template



Section 5

Maintenance and Assembly Drawings

Drawing and Parts List

Use Figures 5-1 and 5-2 when identifying *PA400/403* and *PT400/403* printer parts, assemblies, and kits for troubleshooting and repair. For replacement parts and pricing, contact your Zebra distributor. Tables 5-1 and 5-2 list replacement parts and kits available for the *PA400/403* and *PT400/403* printer. Some of these are available only in kit form or as subassemblies.



Note • No piece parts in these kits or subassemblies, unless otherwise listed, are available separately.



Table 5-1 Replacement Parts and Assemblies (See Figure 5-1)

Item	Qty	Part Number	PA400	PT400	PA403	PT 403	Description
1	1	505086	X	X	X	X	Tear Blade
2	1	505145M	X	X	X	X	Printhead Assembly
3	1	505040M	X		X		Print Mechanism Module Assy
	1	505040-02M		X		X	(less Printhead Assembly)
4	1	505014	X	X	X	X	Battery Access Door
5	1	580018M	X	X	X	X	Power Board
6	1	58008M	X	X			Main Logic Board
	1	52700M			X	X	
7	1	505073	X	X	X	X	Cover Screws (quantity of 20)
8	1	505004M	X	X	X	X	Membrane Switch
9	1	562005M	X	X	X	X	Cable Harness/Sensor Assy
10	1	81519	X				Housing Logo
	1	82330		X			
	1	AA6002-1			X		
	1	AA6002-2				X	
11	1	580013M		X		X	Ribbon Sensor Board
12	1	52582M	X	X	X	X	IrDA PCB Assy (IR units only)
13	1	52711M	X	X	X	X	IrDA Cable (IR units only)
14	1	44176	X	X	X	X	Clip, Wire (IR units only)

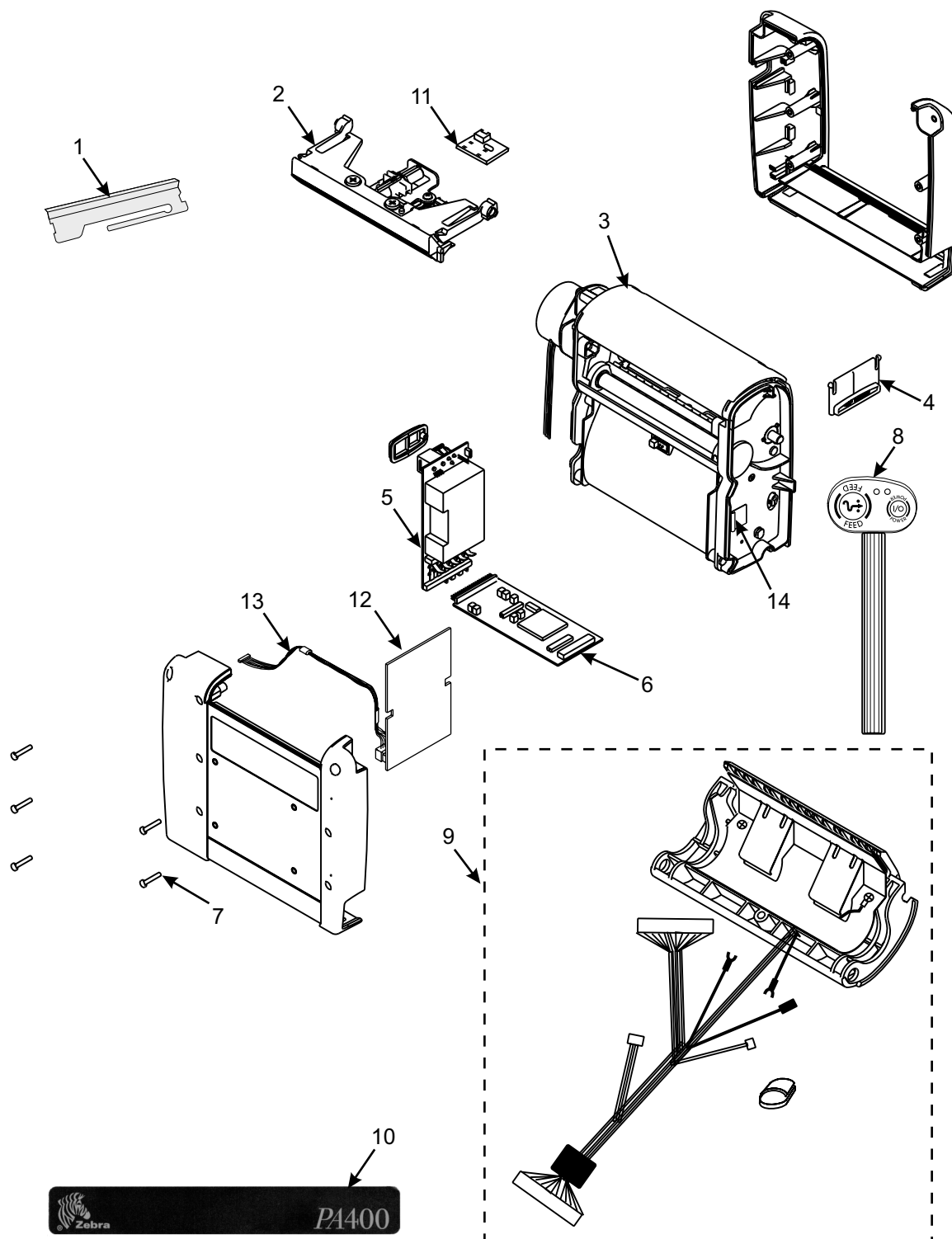


Figure 5-1. Main Printer Drawing

Table 5-2. Option and Accessory Kits

Item	Qty	Part Number	Description
1	1	567000	120 VAC Charger
2	1	562006	Accessory Cable RJ45/DB9
3	1	567001	Universal Charger (Without Power Cord)
4	1	561017	Power Cord UK IEC320-C7
		561018	Power Cord Aust IEC320-C7
		561019	Power Cord Euro IEC320-C7
		561020	Power Cord US IEC320-C7
5	1	505075-1M	Zebra [®] Fastrap [®] and Hardware Kit
6	1	505081M	Standard Battery (700 mAh) US/Canada
		505080M	Extended Life Battery (1400 mAh) US/Canada
7	1	UMAN-PA/PT40x	PA/PT40x User Guide
8	1	46530L	ZPL II User Guide

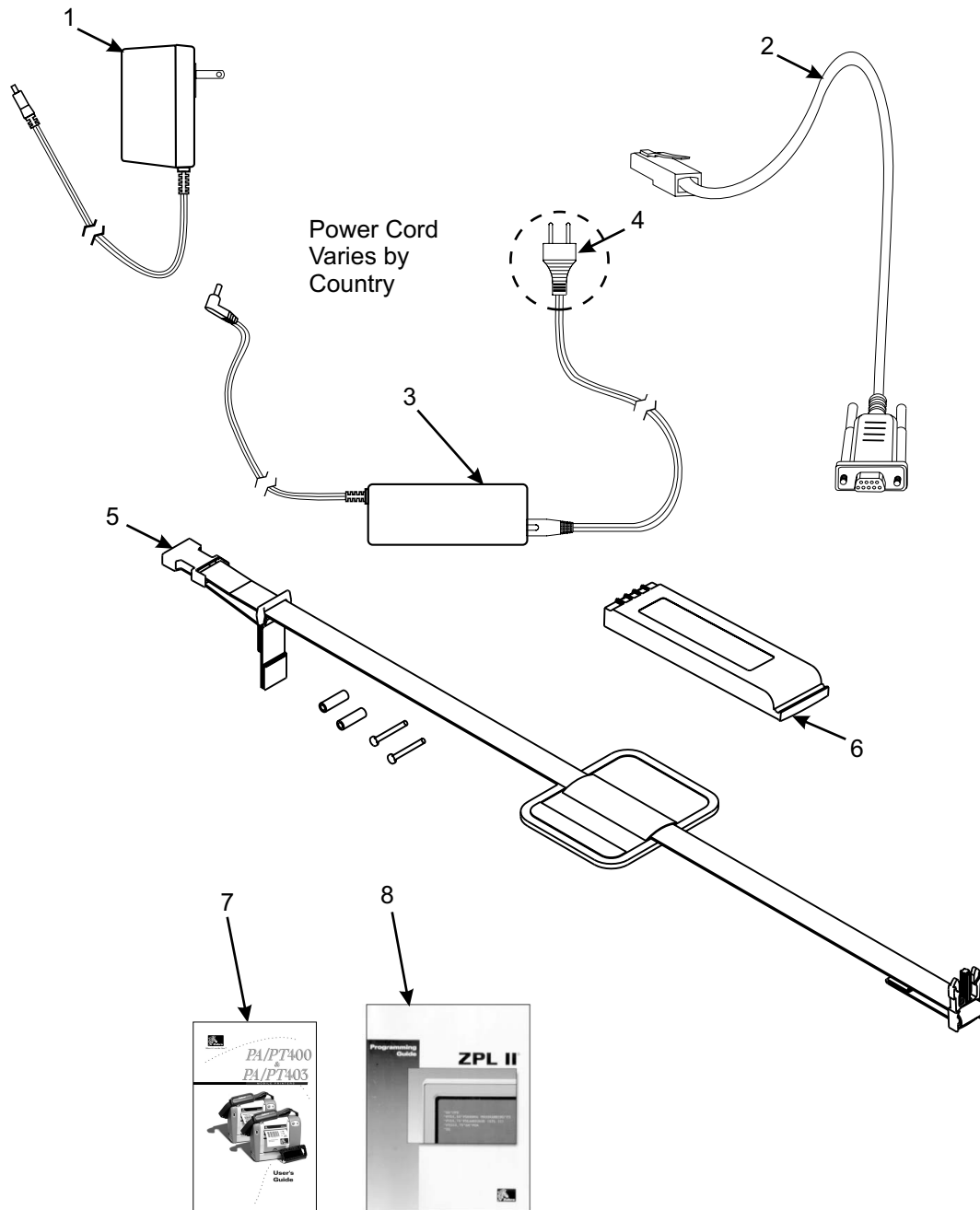


Figure 5-2. Option and Accessory Kits

Power Supply Board Layout

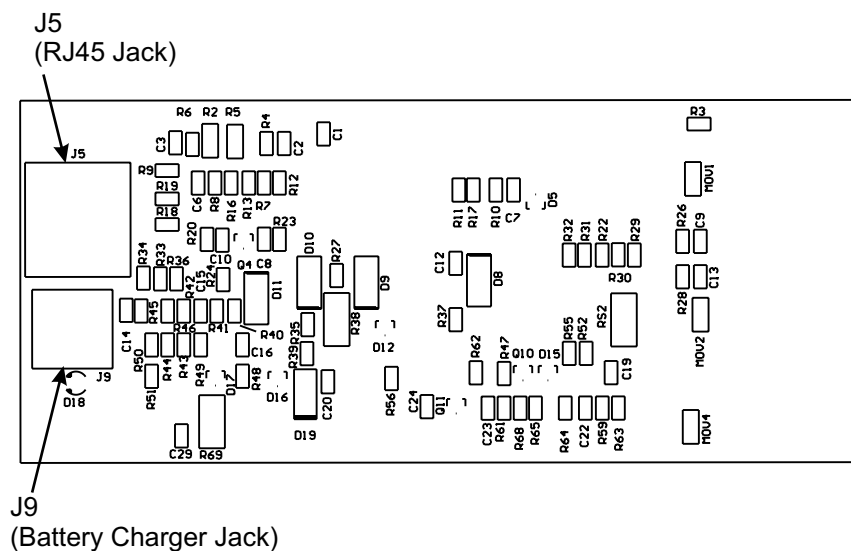
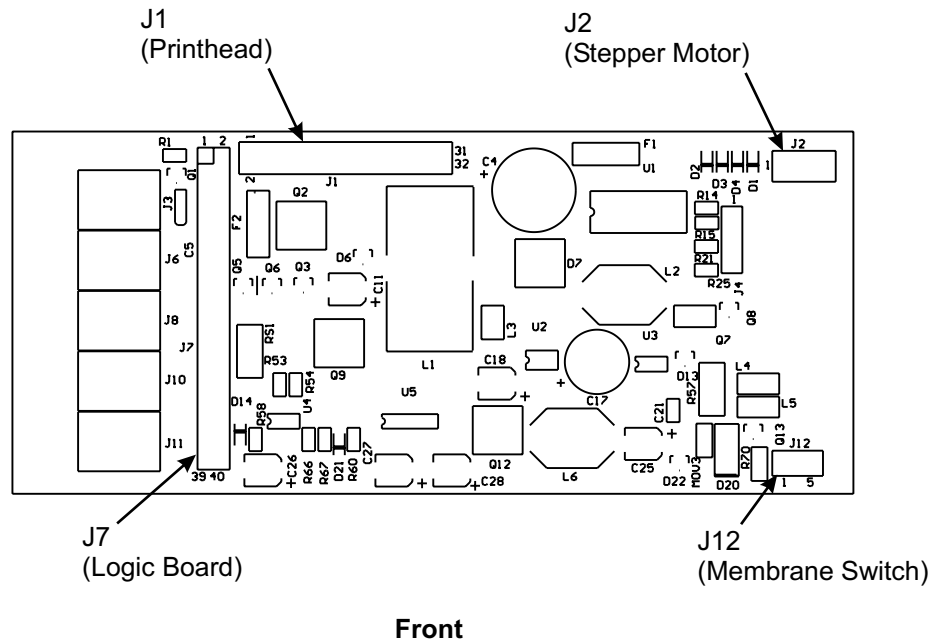


Figure 5-3. Power Supply Board Layout

Main Logic Board Layout

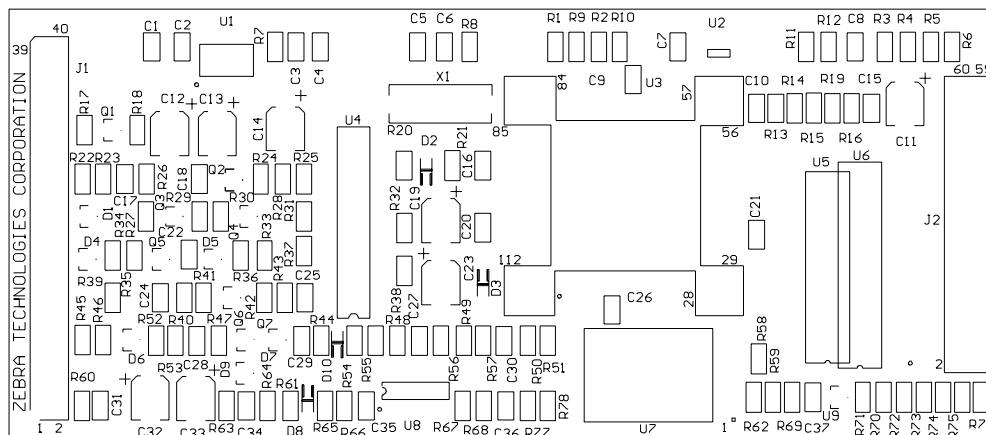


Figure 5-4. Main Logic Board Layout

